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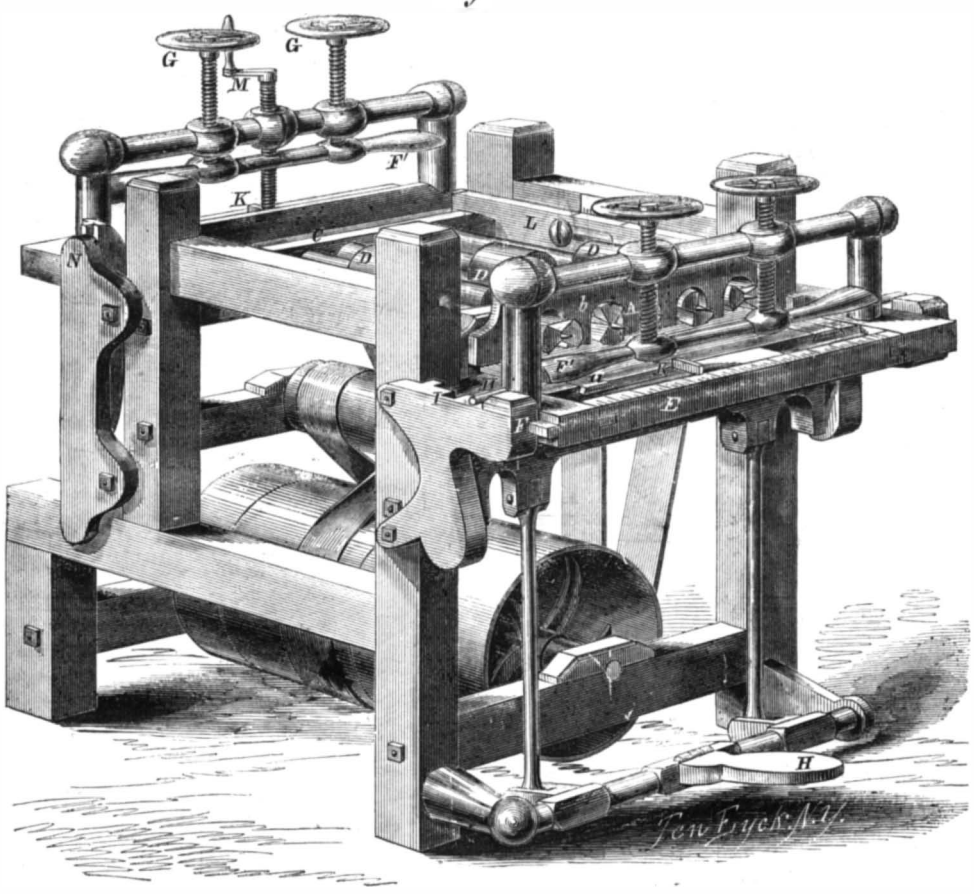
Improved Dovetailing Machine.

The machine herewith illustrated is one of a very useful and highly desirable class, as the quality of joiner-work done by it is very much better and can be afforded at lower rates than that executed by hand. This machine is simple and strong; it is easily operated, and has no "gim-cracks" about it to get out of order. All the movements are positive or straight up and down, and do not require an enormous expenditure of power to move a quantity of machinery that might have been dispensed with. Our engraving represents a machine with a wooden frame, but those now made by the inventors have cast-iron frames and are of a more elegant appearance; the character of the machine and the disposition of the several parts remains the same. A short inspection of the machine is sufficient to enable any one to comprehend its workings, and we append a brief description which will aid the reader in his examination of the same :—

Fig. 1



KING AND NORRIS'S DOVETAILING MACHINE.

The dovetail made by this machine is peculiar in that it is round; both tenon and mortise are made on one machine and at the same time. The cutters and bits, A B (Figs. 1 and 2), run in the bearings, C, and are driven by belts passing over the pulleys, D. On the end of the machine, towards the reader, there is fitted a table, E, working in guides, F. The stuff to be dovetailed is placed on this table and secured by the clamps, F', and the clamping screws, G; the table has a horizontal motion to and from the bits. The treadle frame, H, works in the guides I, and has a series of chisels or cutting tools, J, affixed to it, which can be seen in an enlarged form in Fig. 3. The table is also provided with a scale of inches and a sliding plate, K. The treadle is hinged at *a*, so that it can be removed when not in use. There are, further, adjustable stop pieces at L, which are also furnished with a scale of inches and can be adjusted as desired; so also can the stop, *b*. On the extreme end of the machine are the cutters working in the guides, N, and the table for sustaining the work operated on. The plan of the machine in Fig. 2 shows the bits more clearly than the perspective view. The table has also a vertical movement, but is operated by the screw, M, instead of a treadle as on the further end. These are the principal details of the machine; the operation of it is as follows :—

When the machine is started, the bits and cutters revolve rapidly; the table is drawn out as far as possible from the cutters, and the gage set to correspond with the desired depth of the mortise. The board to be dovetailed is laid on the table and firmly secured there; it is then slid up to the revolving bits which rapidly cut out a cylindrical hole. The table is then drawn out and the workman, by pressing his foot on the treadle, brings the chisels up against the planks and cuts out the neck left by the bits. The gage on the other end of the machine has been set to correspond with the first one, and the male dovetail is produced by the rapidly-revolving cutters—the table being elevated or depressed as required by the screw, M; these boards now only require to be fitted together and glued to form a strong and substantial joint. The advantages claimed for this machine are greater rapidity of execution, combined with accuracy of workmanship, which points will, we think, be conceded by all.

Among the minor evidences of the progress of any nation toward a high degree of civilization and social cultivation, there are none more prominent than the uses to which the various woods known to commerce are applied and made subservient either for decoration or more substantial benefits. The first attempts at wood-working were rude and awkward enough, and we can recall to mind how the aborigines, unacquainted with any better method, yet impressed with the necessity for using some means, felled trees by the aid of fire and the rude stone hatchets they found in the mountains. The canoes by which they navigated the waters of the ocean were also hollowed out by the agency of fire and sharp shells, and the workmanship, as may be supposed, was in keeping with the skill and appliances within reach of the craftsman. Even then, while these children of the forest were painfully laboring on their clumsy boats, the white man navigated the sea with ships which, although not by any means clippers, could not have performed their voyages with safety unless they had been wrought into shape by the aid of wood-working machinery of some sort or other.

The earliest mention of any tool for working is not easily decided, but the tool itself was probably an ax, as being the most direct and positive in its operation and result. It is a most efficient implement in the hands of those accustomed to its use; with it the Russian workman makes chairs, tables and all sorts of domestic furniture, and it supplies the place of a workshop to the inhabitants of that country. The ax, however adapted to those primitive days, is far from desirable in these, when elegant, rapid and perfect wood-working tools are in demand.

In combining several pieces of wood for carpentry, as in dovetailing, the different circumstances of the plank, as respects its length and width, should always be borne in mind. Provision must be made so that the shrinking and swelling are as little restrained as possible, otherwise changes in the atmosphere will warp them with an irresistible force. The principal reliance for strength must be placed on wood cut with the grain so far as possible, as it is of course much less liable to break than a cross-section. When the grain of the four sides of a box run in the same direction, they will expand and contract equally and do no mischief to the work, and it is in all cases more advisable to prepare boxes in this manner than in the way pointed out previously, which is likely to result injuriously; these matters are well understood by all who have given the subject attention. The ordinary methods of dovetailing consist in providing the edge of a board with a series of projections, not unlike in shape the tail of the bird from which the work is supposed to receive its name. These projections fit into recesses of a corresponding shape and size in another board, and the whole, when firmly glued together, forms a strong substantial joint without the aid of nails. We are unable to trace the origin of this invention, but it has been universally adopted at the present day, and until quite recently (comparatively speaking) was always performed by hand. It was once thought to be great evidence of fine workmanship when a young man could produce a perfect dovetail without botching it, and have all the joints come tight, fair and even. This of course involved great expenditure of

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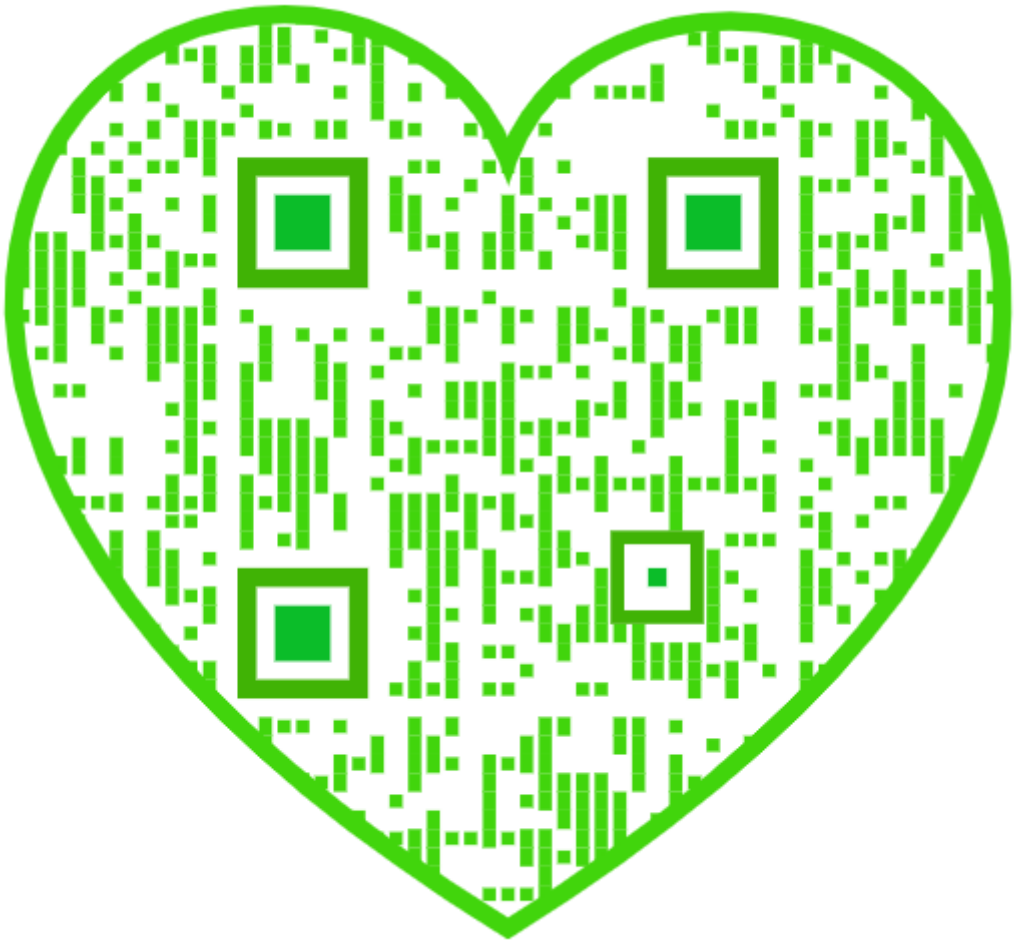


time and labor, and did not pay for the outlay except in cases where high prices were obtained for work All this has been changed by the introduction of dovetailing machinery, and the tool herewith illustrated is a very excellent one of its class. The ordinary dovetail is very apt to break off at the necks and split in the recesses, and is objectionable on this account, unless great care be observed in its manufacture. This feature is avoided in the work produced by Norris & King's machine, which is, so far as mere technicality is concerned, *not* a dovetailing machine, for no one ever saw a dove with a tail resembling the work turned out by them. The patent papers before us describe the work as a "pedunculated disk," as this term is *rather* incomprehensible to most persons, we may say that the portions of the wood (left by the tools) which fit into each other are round and connected by short square necks to the board; the recesses are of course similar and the two fit together perfectly when completed. This invention was patented on January 22, 1861, by D A. King and T. Norris, of Lexington, Ky. For further information address them at that place.

Fig. 2

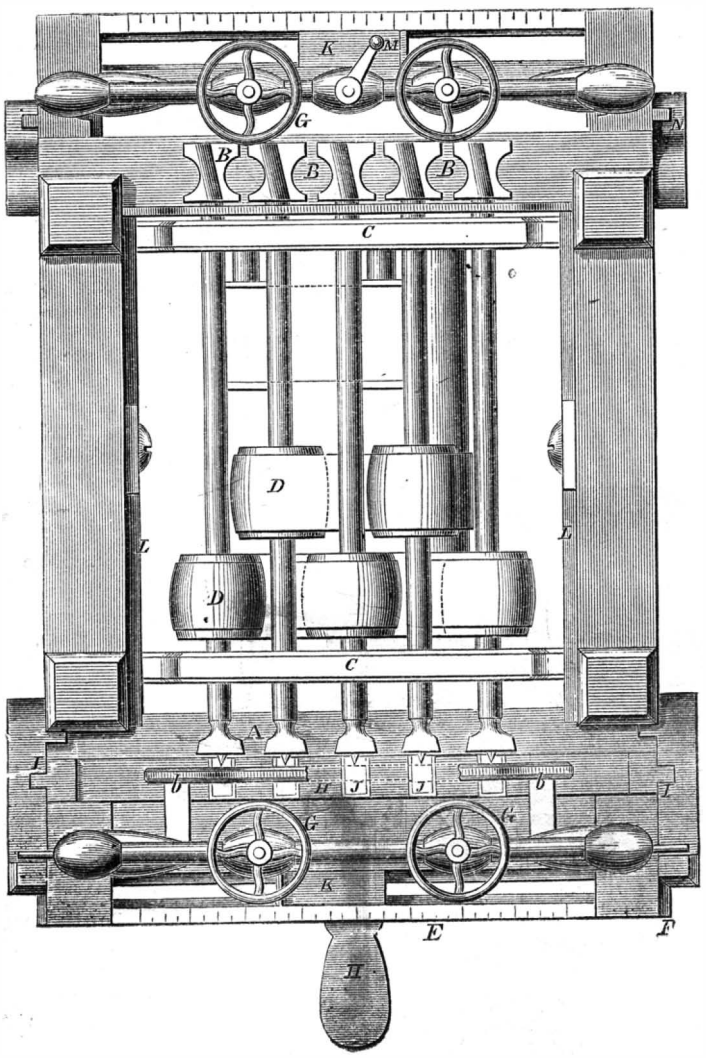
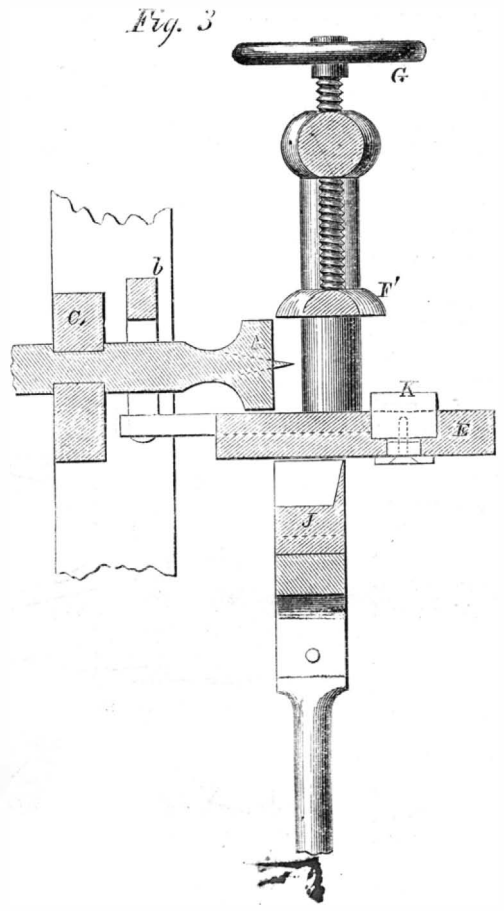


Fig. 3



DOVETAILING AND MORTISING MACHINE.

The Amoskeag Gun Factory.

The Amoskeag Gun Manufactory is an important addition to the works in this city. The Amoskeag Company got a contract from Government for making Springfield rifled muskets one year ago this month, though they had promise of it earlier, so that they commenced putting in machinery some two months previous. In their regular machine-shop they had worked on guns the previous year, but arrangements for carrying on the gun business permanently was not started till about fourteen months ago. We do not speak now of the nice, varied, and complicated machinery necessary for forging, forming and finishing the stocks, locks, bayonets, barrels, ramrods, and trimmings, but of the materials and making of the barrels. As soon as the war became a settled thing, the different iron-rolling mills of the country turned their attention to rolling gun-barrels out of American iron, and had no doubt of their success. It is said that Washburn, the celebrated car-wheel manufacturer of Worcester, has expended $100 000 in experimenting on them, but no one has been very fortunate. At first the Amoskeag Company supposed they could purchase the barrels ready rolled, but found they could not rely upon getting perfect barrels, so they bought English iron, forged their barrels for their first lots, and have now nearly completed machinery for rolling their own as fast as they wish. This is the last piece of machinery necessary to enable them to make every part of a rifle from the crude material, and there are only some three gun-shops in the country that can say as much; they are apt to get their locks at one place, their barrels at another, and so on with the different parts.

The Amoskeag Company have very efficient machinery, the patterns of which they bought, and duplicates of which they made at their machine-shop When it is known that the crude materials have to go through about 500 different operations before they come out a gun, it becomes evident that it was a long operation to make so much machinery, and the wonder is that they are now in perfect running order. It is wonderful to what perfection inventors have brought machinery, so that a slab of black walnut is rounded, grooved, perforated, dished out and dovetailed till it becomes a perfect stock, ready for the lock, barrel, ramrod, butts, rings, trigger and guards, needing no other finishing than sand-papering and oiling! This walnut slab goes through eighteen operations with machinery before it is finally completed.

However much contractors may have cheated the Government in other departments, they have a poor chance for doing so with guns. The Government keeps an inspector here who examines every part of the gun before it is put together, tries it by a guage, and its strength, and puts his mark on each piece. Mr. Jacobs is the chief inspector, and he has two assistants to see that everything is perfect. Each part of a gun will fit every other gun, every piece being fitted to a guage, so that if on trial a hammer, screw, trigger, ramrod, or any other part should fail, another one is ready. The tests applied are severe, especially to the barrels, ramrods, bayonets, locks and tubes. The barrels, before being completed, are tested in a room made for the trials, with five times as much powder as one would dare to use if he held the gun in his hands. Slugs and an immense amount of wadding are put on top of the charge with an apparent design of bursting the barrels if possible. Very few burst. The bayonets and ramrods are bent, struck upon timber, and their quality is otherwise roughly tried. After a gun has stood the inspector's trial it is good for a campaign.

The Amoskeag Works sent off the first lot of the Springfield rifled muskets last week. They are now making them at about the rate of 2,000 a month. At the end of two months they will be able to make a hundred a day. They now employ on this work about 250 men. and will increase the number to about 350. All this work will be permanent for years. In addition to those of the Springfield pattern of 1861, they have a contract for making Lindner's breech-loading carbines, and with both this and other contracts in prospect they will find work enough. This carbine is a most serviceable weapon —as good a one as there is in the service.

Some might suppose that the gun business would be overdone, but it is said that the guns average only two years of service, and if that is the case, for many years there will be no danger of a surplus.

The gunmakers receive good pay, and the business keeps among us an excellent class of citizens. For this business we are indebted to the enterprise, far-sightedness and perseverance of E. A. Straw, the agent of the Company.—*Dollar Weekly Mirror*

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THE HOUR OF TRIUMPH!

The cheering progress of our armies for the past two weeks has revived the drooping spirits of those who faltered. It has refreshed the energies of even the staunchest patriots, who could not but look with concern upon the ominous appearance of the future of our country. Disloyal sentiments prevailed to some extent at the North; and among the loyal classes a tone of despondency was apparent, while the disaffected rejoiced correspondingly. Appearances are often deceitful. The exultation of the traitors was short lived; their hopes perished as quickly as they were born. Gen. Lee entered Pennsylvania with a legion of rebels ready to fall upon the teeming coffers of the North. Our continued prosperity aggravated them; their privations and sufferings maddened them Some slight successes at the outset filled them with delusive hopes that their march northward would be triumphant. In one fell hour, for them, the scene was wholly changed. The sunshine of promise that opened before them turned to the lurid glare of disappointment, and crushed, beaten back, disorganized by the bravery of our troops and the skill of our generals, the shattered forces of the traitors are sent whining to their holes.

Following swiftly on the heels of this triumph at the North, comes the news of the reduction of Vicksburgh, and the loss to the rebels of the stronghold of their territory. The endurance of the soldiers of the army of the West, their valor and discipline, are the fullest proofs of efficiency on the part of the generals, and no man need claim a higher honor than to say he belonged to the army of the Potomac or to that in the South-west.

Awakened as from a nightmare of despondency into which it had been plunged through incompetency, high and low, the nation breathes freer; it stretches out its strong arms and prepares to gather in the fruits of victories. The political advantages likely to spring from these important victories lately achieved by our arms are incalculable, and will, we hope, forever silence the sneers, caviling and threats of disaffected persons at home and unfriendly Governments abroad. Let every loyal person rejoice that at last, in its hour of peril, the mighty strength of this people has been made manifest. The struggles that seemed to presage dissolution were only the throes of awakening life; and, renewed in strength and purpose, the Government of these United States of free America will go forward to the completion of the glorious destiny open before it.

We wish success to our arms as our only hope. If any of our readers should chance to differ from us on this most vital point, we wish them to read "What the Rebels propose to do with our Coal Mines," published in another column and taken from the Richmond *Whig*.

MAJOR-GENERAL GEORGE GORDON MEADE.

On the 28th day of June, Major-General George Gordon Meade was ordered by the President to take command of the army of the Potomac. He at once issued a modest yet soldierly order to his army, and put it in rapid motion towards Gettysburgh, Pennsylvania, at which place the rebels under General Lee were in large force, "flushed with the pride of successful invasion." In a series of brilliant and sanguinary battles fought under the eye of the Commanding General, and continuing three days, desperate charges were repeatedly made by the enemy; but as often as they were made, so often did the brave army of the Potomac withstand the shock, until the rebels were everywhere repulsed and commenced a rapid retreat towards the Potomac. General Meade was not unprepared at any point where his lines were attacked; he always had a supporting force to assist in every emergency. All the accounts which we have read satisfy us that for skillful generalship and dauntless bravery, no other battles since the war began can compare with these. Under the most trying and extraordinary circumstances, General Meade has exhibited the highest strategic and tactical skill, and has risen to the rank of a great "military captain." Without detracting at all from the merits of other generals, an extinguisher is effectually put upon that miserable partisan cry that the army of the Potomac would only fight under a certain leader, when the truth is that this army has always fought with great valor; the trouble being more with the commanding officers than with the troops. We rejoice, in common with all loyal hearts, in the apparent fact that, after a series of bloody reverses and few successes, this Potomac army has at last found a true military leader —one who seems to understand his business.

Our readers will be interested in the following brief sketch of General Meade's life and career. He was born in Spain in the year 1815, of American parents. His father was, at the time of his birth, residing in Barcelona, Spain, where Captain Meade, now commanding the *North Carolina*, and General Meade, the subject of our sketch, were born. The two boys were brought to this country; one was educated for the navy, which he entered in 1826; and the other for the army. George G. Meade entered West Point Military Academy, as an appointee from the State of Pennsylvania, during September, 1831, and graduated on the 30th of June, 1835, standing number nineteen in his class, which has produced such men as Generals Morell, Naglee, Haupt, Patrick, Martindale, Roberts, and others. He was appointed in the army from the District of Columbia, and entered the service as brevet second lieutenant of the Third Artillery on the first of July, 1835.

His conduct in Mexico was marked by determination and bravery, and at the battle of Palo Alto he was particularly distinguished, and so mentioned in the official reports. During the several conflicts of Monterey, 21st, 22d and 23d days of September, 1846, he again became distinguished, and for his bravery was brevetted a first lieutenant, to date from Sept. 23, 1846. This brevet was awarded in May, 1847. During the month of August, 1851, he was promoted to a first lieutenancy of his corps, and on the 19th of May, 1856, was further promoted to a captaincy, which rank he held at the breaking out of the rebellion. When the rebellion broke out, and President Lincoln called for three hundred thousand volunteers, the Pennsylvania Reserve Corps was raised, and placed under the charge of General McCall, as division commander, and Generals Reynolds, Meade and Ord, as brigade commanders. All of these brigade commanders have nobly distinguished themselves during the present war, having each risen to a rank equal to a marshal of France. General Meade was appointed a brigadier-general of volunteers, with a commission to date from Aug. 31, 1861.

On the 26th of June, 1862, he took part in the famous battle of Mechanicsville, where General Stonewall Jackson made such a terrific dash upon General McClellan's right wing, and Generals McCall, Reynolds and others were taken prisoners. His noble conduct and bravery on this occasion were particularly noticed. The next day he was engaged in the battle of Gaines' Mills and also took a conspicuous part in the seven days' battles before Richmond.

At the battle of New Market Cross-roads he was severely wounded, but under skillful treatment he recovered, and almost immediately returned to the army, where he took command of the Pennsylvania Reserves, and led those troops during the eventful battles of South Mountain and Antietam; and when at the latter battle, General Hooker was wounded and had to leave the field, General Meade for a short time had charge of the Ninth Army Corps.

At the battle of Fredericksburgh, Dec. 13, 1862, he greatly distinguished himself; the whole loss of the division was one thousand six hundred and forty-four, being the greatest division loss during the whole of the disastrous fight.

In March, 1863, the Senate confirmed the appointment of General Meade as major-general of volunteers, to date from Nov. 29, 1862.

During the fearful contests of May 2d, 3d, and 4th at Chancellorsville, General Meade's corps played its part in the same noble manner that had characterized the troops under his special command since the commencement of the war. It bore its part manfully, and in the end covered the retreat of the whole of Hooker's army.

General Meade is a thorough soldier without political aspiration. He has a well poised mind; and above all he is a high-toned Christian gentleman, well worthy of the confidence and support of every lover of his country.

THE great Exhibition building in London has been purchased by Government to use for national purposes.

What the Rebels propose to do with our Coal Mines.

If it be true that the Confederate forces occupy Harrisburgh, the attention of the commanding general will no doubt be directed to the coal-fields, which lie within forty or fifty miles of that city. His first aim will be to cut all the railroad connections, and thus put a stop to the transportation of fuel. His next will be to destroy the most costly and not easily replaced machinery of the pits. Whether he would stop at this is questionable. He might set fire to the pits, withdraw the forces sent out on this special duty, and leave the heart of Pennsylvania on fire, never to be quenched until a river is turned into the pits, or the vast supply of coal is reduced to ashes. The anthracite coal is found in large quantities in no other part of the world but Pennsylvania. Enormous quantities are used in the United States Navy, the countless workshops and manufactories of the North, in the river boats, and even upon locomotives. It cannot well be replaced by any other fuel. The bituminous coal which is found near Pittsburgh would not answer the purpose, even if it would bear the cost of transportation. Our troops already hold the railroads and canals leading from the Cumberland coal-fields. All that is needed is to seize the anthracite fields, destroy the roads and the machinery of the pits, set fire to the mines and leave them. Northern industry will thus be paralyzed at a single blow.

These views may have induced General Lee to move upon Harrisburgh. We doubt whether he would fire the mines, but the destruction of the Mauch Chunk railroads and pit implements would be as legitimate as blowing up tunnels and aqueducts or burning bridges. Of one thing we may be sure, that whatever is best to be done will be done by General Lee, and if he thinks fit to destroy the Pennsylvania mines they will certainly be destroyed. Should he leave them untouched it will be for the best of reasons. But it is impossible not to indulge the hope that he will avail himself of the tremendous power which the possession of the coal-fields, even temporarily would confer.—*Richmond Whig July 2d.*

DARKNESS FROM A VOLCANIC ERUPTION.—At the reading of a paper on "Borneo," at a late meeting of the Royal Geographical Society, London, Mr. Crawford related some particulars respecting the volcanic eruption of the Timboro Mountain in 1814, of which he witnessed some of the effects. At a distance of 300 miles it was pitch dark for three days; the ashes were carried by the monsoon to a distance of 1,200 miles from the mountain, and for ten days he was obliged to write by candle-light.

THE bark *Western Metropolis*, formerly a large passenger steamer upon Lake Erie, is of 1,350 tuns burthen, and can carry about 65,000 bushels of grain, or twice as much as any other vessel on the lake trade. Her length is 280 feet; breadth of beam 40 feet, and depth of hold 14 feet. She carries about 5,000 yards of canvas. She sailed recently on her first trip from Chicago to Buffalo, carrying 72,000 bushels of oats, and 1,000 barrels of pork—the largest cargo ever moved on the lakes.

MORE factories are being erected and will soon go into operation at various points in Wisconsin. The wool interest of that State is destined to be a great and important one in the future. The immense prairies produce, spontaneously, nourishment for thousands of flocks of sheep.

THE first wool sale of the season has been made in Michigan at fifty cents. The wool crop of the State last year was 6,500,000 pounds, and it is estimated that it will be increased the present year by 2,000 000 pounds. The whole wool clip of the country this year will reach 100.000.000 pounds.

PERTINENT.—An exchange says that when the convict D'Utassy arrived at Sing Sing, he incidentally mentioned that he had a University education, and was master of eleven different languages. The keeper replied: "One language is all we have here, and we want very little of that."

THE Tredegar Iron Works, recently burned at Richmond, have been rebuilt, and are now in full blast.

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PREVENTION OF DECAY IN TIMBER.

The treatment of timber to secure it from rapid decay is a subject of great importance to shipbuilders, railway engineers, bridge-builders and all others who are interested in the preservation of wooden structures intended to be exposed to the winds, the waters and the weather. Iron is undoubtedly taking the place of timber with advantage for many purposes, but the latter material is so convenient and so capable of being shaped and combined in suitable forms, that it will always be used to a great extent. One of its chief defects is liability to rapid decay, depending upon its condition and the circumstances connected with its application. Every item of information, therefore, which will tend to promote its durability is of great value. On a former occasion—on page 390, Vol. VII. (new series) of the SCIENTIFIC AMERICAN—we briefly noticed some experiments which had been made in France in treating ship timber by M. Lapparent, director of the dockyard and inspector of timber for the navy. His printed report to the Government has lately been forwarded to us, and it contains a considerable amount of valuable information, some of which we shall present in a condensed form.

The sap of timber is composed of nitrogenous elements which are called *unstable*, because under certain circumstances they are so liable to change—producing rot. When timber is treated so as to alter the nature of the sap or to dry it completely by what is called *seasoning*, it resists decay more effectually than if used without being dried. Moisture and confined air tend to produce decay in timber, and on the other hand timber exposed to a free circulation of air and shielded from moisture will retain its strength almost unimpaired for centuries. The oak beams, rafters and other timbers of old churches and houses which were built before the plastering of walls was introduced, have remained sound for six and seven hundred years. Of course, ships cannot be kept dry, but if their timbers are well seasoned before they are exposed to the elements, it has been found by experience at the French naval dockyards that they will endure five times longer than timbers not thoroughly seasoned.

It is well known that when timber is steeped for a certain period in water, then exposed to the air to dry, it seasons more rapidly. It has been customary, therefore, to immerse ship timber in water prior to drying it. On this head M. Lapparent states that the practice of those shipbuilders who steep their timber in sea water is wrong, and that fresh water is the most suitable for this purpose. For oak planking, he states, it should be steeped one year in river water, two years in fresh water not so frequently changed; while in brackish water, continually changing, it requires three years' immersion.

In drying timber to season it, exposure to the air is the most simple method, but this requires a very long period of time for large ship-timber. Another method consists in drying it in large rooms exposed to currents of hot air driven in by fans. By this system the surface of the timber is liable to become dry and crack before the interior is seasoned, and for planking it is, therefore, objectionable. Another method has lately been tried near Cherbourgh, France, which consists in exposing it to the smoke, steam and gas of wood and coal under combustion. The small amount of moisture in the smoke prevents the timber from cracking, and M. Lapparent looks upon this mode with favor. But his favorite method in treating timber to prevent its decay is the charring of its surface. He states that this plan was once tried during the last century in the British royal dockyards; that the frigate *Royal William* was built of carbonized timber, and that it was one of the most remarkable cases of durability on record. This system has been revived in France with improved apparatus, and it is about to be extended to all the dockyards in the empire. The timber to be operated upon is secured upon an adjustable table and its surface is slightly charred by a flame of gas mingled with a jet of air. The consumption of gas is 200 gallons for 10 square feet of carbonized surface, and one man can carbonize 440 square feet in ten hours. Some timber is improved by giving its surface a very thin coat of tar before it is charred. It is stated that the whole surface of timber is carbonized with great uniformity by this method, and M. Lapparent says:—"It ought to be applied to every surface in contact with, or in general intended to be surrounded by, moist and stagnant air." It is also recommended for treating the beams and joints of house timber, intended to be embedded in the walls or surrounded with plaster. By carbonization a practical and economical means is also offered to railway companies of preserving, almost for ever, their sleepers, particularly those of oak. In France the annual cost for vine props amounts to no less than $24,000,000. By charring these this cost will be reduced two-thirds, and a relative saving will also be effected in thus treating hop poles. As the vine and the hop are extensively cultivated in America, this system also deserves the attention of our people who raise these agricultural products.

In building ships M. Lapparent suggests that horizontal holes should be bored through the ribs, at certain distances apart, and there should be spaces between the outer and inner planking to permit currents of air to be driven between the ribs, also that portions of the ribs should be smeared with a paint composed of flowers of sulphur, 200 parts; linseed oil, 135 parts; and manganese, 30 parts, to prevent the development of fungi. In conclusion M. Lapparent says:—"I have pointed out the means for preventing the rapid decay of timber; they are simple, logical, economical, easy of adoption and perfectly innocuous. By employing them we shall save that timber for building ships which is, in my opinion, far superior to iron for the same purpose."

A correspondent of the London *Builder* states that the Belgian Government now require all the wood sleepers used on the state railways to be creosoted, and the Government of Holland has adopted a similar resolution. The creosote used is simply what is called the "dead oil" of coal tar. M. Crepin, a Belgian engineer, has also made a series of experiments with creosoted timber in harbors and docks, and in his report, lately published, he states that timber so treated was found successful in resisting the attacks of marine worms. Timber is used to a greater extent in America than in any country of an equal population in the world. If by any mode of treatment our ship, bridge, railway, house, fence and other timber can be rendered twice or three times more durable, a saving to that extent may not only be effected in material but in the labor required for preparing and applying it. All the processes, therefore, which have been set forth for preventing the rapid decay of timber deserve careful and general attention, because they relate to interests which affect every class in the community.

SCREW-PROPELLERS—TECHNICAL TERMS.

The following definitions of the principal technical terms used in connection with screw-propellers may be found useful to some young engineers in enabling them to understand conversations or printed articles on that subject:—

The "axis of the screw" is the imaginary line drawn through its center in a fore and aft direction. The "radius of the screw" is the imaginary line drawn at right angles to the axis and extending to the most remote part of the blade, and it is technically called the "directrix;" twice this radius is the "diameter of the screw."

The "length of the screw" is its length on a line parallel with its axis; the "length of the hub" and the "length of the blades" are measured on the same parallel line.

The outer edge of a blade is called the "periphery;" the forward edge is called the "leading edge;" the after edge is called the "following edge." The "radial length" of a blade is its length measured from the outside of the hub to the periphery in the direction of the radius.

The "pitch of a screw" is the distance (measured in a line parallel with the axis) which a screw would move in one revolution if revolved in a solid nut. A "true screw" has the pitch uniform for every part of it. When the forward part of the screw has less pitch than the after-part, the screw is said to have "a varying or expanding pitch longitudinally;" and when the outer part of the blade has a different pitch from the inner part, the screw is said to have "a varying pitch radially." The "fraction of the pitch used" is the comparison of the aggregate lengths of the blades with the entire pitch.

The after-face of the blades is called "the driving surface," and the forward face "the drag surface." The "angle of a screw" is the acute angle included by a plane at right angles to the axis and the driving surface of the plane. This angle varies at each point of the radius.

The "effective area of a screw" is the projection of the screw-blades drawn on a plane at right angles to the axis. The "oblique area" is the actual area of the driving surface measured obliquely. The "disk area" is the area of the circle described by the radius of the screw.

The "center of pressure" is that position on the blade around which the forces exerted by the blade will counterbalance each other.

A screw is said to be "right-handed" when the upper blade turns from port to starboard, while propelling the vessel ahead; the reverse of this describes a "left-handed" screw.

The "cohesive attraction of the water" is the resistance which the water offers to the blade passing through it, in contradistinction to the direct resistance which the water presents to the screw, when being driven away from it.

The spiral line described by any one part of a screw, as it progresses through space, is called the "helix."

The difference between the speed of the vessel and the speed of the screw, in a line parallel with its axis if it were screwing into a solid nut, is called the "slip." This difference is generally expressed as the "per-centage of the speed of the vessel." When the speed of the vessel exceeds the speed of the screw (as it sometimes does when the vessel is being propelled principally by sails), this excess is called the "negative slip."

VALUABLE RECEIPTS.

NEW CHROME GREEN.—The London *Chemical News* gives the following receipt for manufacturing a beautiful new chrome green color adapted for painting and topical printing:—Take 10 ounces of boiling water and dissolve in it one ounce of the bichromate of potash, and to this add 6 pints of the biphosphate of lime and 3 ounces of brown sugar. When these substances are mixed a disengagement of gas takes place and the liquid fumes. It is allowed to stand until this action ceases, then it is decanted and left to stand for about ten hours when a beautiful green color is deposited. It is washed with cold water and dried in a warm room. The green color thus obtained is stated to be fixed on cloth in printing by mixing it with albumen. It may be used both as a water color and as an oil paint.

TO CLEAN BRASS.—Rub the surface of the metal with rotten-stone and sweet oil, then rub off with a piece of cotton flannel and polish with soft leather. A solution of oxalic acid rubbed over tarnished brass with a cotton rag soon removes the tarnish, rendering the metal bright. The acid must be washed off with water and the brass rubbed with whitening in powder and soft leather. When acids are employed for removing the oxide from brass, the metal must be thoroughly washed afterwards or it will tarnish in a few minutes after being exposed to the air. A mixture of muriatic acid and alum dissolved in water imparts a golden color to brass articles that are steeped in it for a few seconds.

CLEANING TINWARE.—Acids should never be employed to clean tinware, because they attack the metal and remove it from the iron of which it forms a thin coat. We refer to articles made of tin plate, which consists of iron covered with tin. Rub the article first with rotten-stone and sweet oil, the same as recommended for brass, then finish with whitening and a piece of soft leather. Articles made wholly of tin should be cleaned in the same manner. In a dry atmosphere planished tinware will remain bright for a long period, but they soon become tarnished in moist air.

CLEANING SILVER PLATED ARTICLES.—White metal articles electro-plated with silver are now very common and great care is required in cleaning them when tarnished. No powder must be used for this purpose which has the least grit in it, or the silver will be scratched and soon worn off. The finest impalpable whitening should be employed with a little soft water in removing the tarnish. They are next washed with rain water, dried and polished with a piece of soft leather, some rouge powder or fine

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whitening, then finally rubbed down with the hand, which forms a most excellent polisher.

Construction of Piers in Deep Water without Coffer-dams.

The construction of common coffer-dams in deep water, for the purpose of building piers and sea walls, is a very tedious and expensive undertaking. The London *Artisan* contains an article on this subject, in which a method is described of constructing sea walls in deep water without coffer-dams or diving-bells. This system has been carried out at the new harbor at Greenock (Scotland), by D. Miller and H. Bell, engineers-in-chief of the harbor works. These works had been projected almost entirely beyond the high water line into the sea. The outer pier would ultimately be upwards of 3,000 feet in length and about 60 feet wide at the top, with quays on both sides. Within this there would be space for two harbors, each 1,000 feet in length, 15 feet deep at low water, and 25 feet at high water, with entrances 100 feet wide, and ample room for the construction of graving docks, for the storage of timber, and for the erection of sheds. At present it was only proposed to erect about one-half of the sea pier, and to form one harbor or tidal dock. In the design of these works it was suggested that the walls under low water should consist of a combination of cast-iron guide piles in the front, with a continuous stone facing, slid down over and enclosing these piles; timber bearing piles being used in the body of the walls where required, and concrete backing being deposited in a soft state; and that the upper part of the walls should be built of masonry in the usual manner. The first operation, when the water was not sufficiently deep, was to dredge two parallel trenches to the required depth, 17 feet below low water, for the foundations. A staging of timber piles was afterwards erected in the line of the pier over its whole breadth, for carrying the tramways, traveling cranes, and piling engines. The cast-iron guide piles were then driven from the staging with great precision, 7 feet apart in the line of the face of each quay wall. These piles were driven until their heads were near to the low water line, by pile engines, furnished with long arms projecting downwards, strongly stayed by diagonals, and forming a trough, into which the pile was placed, and from which it was shot, like an arrow from a cross-bow. The piles were connected at the top transversely by wrought-iron tie-rods stretching through the pier. When the piling was driven, a bed of hydraulic concrete, 3 feet thick and 20 feet wide, was deposited in the trenches to form a base for the wall, and to give a large bearing surface. Into the grooves formed by the flanches of the iron piles, large granite slabs, from 18 inches to 2 feet thick, were slipped, the bottom one resting on the concrete base and on a projecting web cast on the piles. This constituted the face of the wall, and in each compartment between the piles, 16 feet in height and 7 feet in width, there were only three stones. Behind this facing, hydraulic concrete was lowered, under low water, in large boxes having movable bottoms, and was discharged in mass to form the body of the wall. To confine this at the back before it had set, loose rubble stones were deposited. The hearting of the pier consisted of hard till stones and granite up to the level of low water. When the whole of this mass was consolidated, the heads of the iron piles and the granite facing blocks were capped by a granite blocking or string-course, and the upper portion of the walls was built in freestone, ashlar, and rubble. The remainder of the hearting between the walls was then filled in, and the whole finished with a granite coping and causeway. The walls were 33 feet in height from the foundations, 11½ feet thick at the concrete base, diminished by 5 feet at the top. In the part of the work already executed, the outer flanch of the iron piles was exposed to the action of the salt water. In future it was intended to reverse this plan, and to make grooves in the stone facing, so that it should overlap the iron piles, filling in the grooves from the top with cement. When the whole extent of the seaward pier was completed, the interior operations for the harbor would be proceeded with; this pier serving as the principal coffer-dam, and a short dam, about 100 feet in length, closing the entrance. It was stated that this method of constructing walls in deep water, without coffer-dams, had been most successful, and that a sea-pier of great solidity and durability had been formed in deep water at a comparatively moderate cost.

The Proper Form for an Ax.

Almost every article, from a steam engine to a penny whistle, has been improved and patented so that it requires an inventive mind to suggest any want in that direction unsupplied. The plow has been subjected to change, till scarce a spot is left to attach an improvement; the stove has a multitude of forms, more numerous than the thousand and one kinds of fuel; the shovel retains nearly its ancient form, though made of a better material; hay and manure forks will pay the inventive expenditure lavished upon them, and so on through a long list too numerous to mention. But who ever saw a good ax? Who ever applied for a patent on the ax? Who suspects, even at this late day, that any improvement can be made in its formation? Where is the man, or association of men, that dare offer a premium for the best ax? The cutting quality of the ax is right, but the form is objectionable. The writer, after using the ax nearly fifty years, has found but one that is right. That one was made to order. The ax-maker should advise with the wood-chopper as to the form and size. But the wood-cutters, like doctors, may disagree. What shall be done? Let premiums be offered for the best ax—also for the best specimens of wood-cutting, and in two years it will be known what is the best form for an ax.—*Massachusetts Plowman.*

[We think our contemporary has omitted the real cause of the difficulty some individuals have in suiting themselves with an ax, and that is the "hang" of it. It is a remarkable fact that a mechanic cannot use his comrade's hammer with any degree of ease, because the handle does not suit his hand; either it is too long or too short, or something of this kind interferes with a skillful use of the tool. So it is with the ax; a man may not use his neighbor's as easily as his own, because he does not get the hang of the handle, and not for any radical fault in the form, weight, or shape of the head. These features have of course some bearing but not so much as the other cause we have mentioned, which is so notorious as to have passed into a bye-word.—EDS.

Railways.

An elaborate statistical article on railways appears in a late number of the London *Engineer*, from which we select a few results. The actual extent of railway now open throughout the world is probably about 70,000 miles, and the capital expenditure nearly one billion one hundred and seventy millions sterling. This vast sum has almost wholly been raised and expended within twenty-five years. The share of this immense capital which Great Britain and its colonies have expended appears to be upwards of four hundred and seventeen millions sterling, and the miles of open railway on which it has been expended amount to 14,277. On the continental railways, four hundred and seventy-six millions and a half sterling have been expended on 22,692 miles of open railway. On the North and South American continents, exclusive of British possessions, about two hundred and fifty-seven millions and a quarter sterling have been laid out on 32,102 miles of open railway. India is included, of course, with the British possessions. Thirty-four millions and nearly a half sterling have been expended in India on 1,408 miles of open railway, and upwards of twenty millions and a half in Canada, on 1,826 miles of open railway. Nearly ten millions have been already expended in Victoria on 183 miles of open railway; but in such cases as those of Victoria and India, works in progress are included in the expenditure named. France has expended upwards of one hundred and eighty-four millions and a half on 6,147 miles of open railway; Prussia, forty-four millions and upwards on 9,162 miles of open railway; Austria, forty-five millions and a quarter on 9,165 miles; Spain, twenty-six millions on 1,450 miles; Italy, twenty-five millions on 1,350 miles; Russia, forty-three millions and upwards on 1,289 miles; Belgium, eighteen millions on 955 miles; Switzerland, ten millions on 600 miles; Egypt, four millions on 204 miles; the United States, one hundred and ninety-three millions and a half on 22,384 miles; the Confederate States, nearly forty-nine millions on 8,784 miles; Brazil, five millions on 111 miles and others in progress.

The Gutta-percha Tree.

The tree called the Isonandra Gutta, which furnishes the gutta-percha, is a native of the Indian Archipelago and the adjacent lands. A few years since this substance, now of such widely extended use, was totally unknown in Europe, for though from time immemorial the Malays employed it for making the handles of their hatchets and creeses, it was only in the year 1843 that Mr. Montgomery, an English surgeon, having casually become acquainted with its valuable properties, sent an account of it, with samples, to the Royal Society, for which he received its gold medal. The fame of the new article spread rapidly throughout the world; science and speculation seized upon it with equal eagerness; it was immediately analyzed, studied, and tried in every possible way, so that it is now as well known and as extensively used as if it had been in our possession for centuries. The Isonandra Gutta is a large high tree, with a dense crown of rather small dark green leaves, and a round smooth trunk. The white blossoms change into a sweet fruit, containing an oily substance fit for culinary use. The wood is soft, spongy, and contains longitudinal cavities filled with brown stripes of gutta-percha. The original method of the Malays, for collecting the resin, consisted in felling the tree, which was then placed in a slanting position, so as to enable the exuding fluid to be collected in banana leaves. This barbarous proceeding, which, from the enormous demand which suddenly arose for the gutta, would soon have brought the rapidly-rising trade to a suicidal end, fortunately became known before it was too late, and the resin is now gathered in the same manner as caoutchouc, by making incisions in the bark with a chopping-knife, collecting the thin white milky fluid which exudes in large vessels, and allowing it to evaporate in the sun, or over the fire. The solid residuum, which is the gutta-percha of commerce, is finally softened in hot water, and pressed into the form of slabs or flat pieces, generally a foot broad, a foot and a-half long, and three inches thick. Gutta-percha has many properties in common with caoutchouc, being completely insoluble in water, tenacious but not elastic, and an extremely bad conductor of caloric and electricity. The uses of gutta-percha are manifold. It serves for water-pipes, for vessels fit for the reception of alkaline or acid liquids which would corrode metal or wood, for surgical implements, for boxes, baskets, combs, and a variety of other articles.—*Hartwig's Tropical World.*

Statistics of Agriculture.

The Commissioner of the Agricultural Bureau, at Washington, has furnished a table regarding the growing crops, which has been made up from reports furnished to the department from all the counties in all the States not under Confederate rule, from which it appears that there is an increase of one-tenth in the area of winter wheat sown, as compared with last year—though the general appearance of the crops was not so favorable. In spring wheat the area sown and the appearance of the crop is about the same as last year. In rye there is an increase of the area sown of one-twentieth, while the appearance is equally favorable. In corn there is also an increase in the area sown, but the appearance of the growing crop was not so good. Sorghum has been cultivated on a vastly larger scale, there being an increase in area of more than one-half the total area last year, while the appearance of the crop is more favorable. It is expected that this article will make its appearance in the market in large quantities nex fall. In cotton, which has been put under cultivation in Delaware, Illinois, Indiana, Kansas, Kentucky, Maryland, Michigan, Minnesota, Missouri, Ohio and Pennsylvania, there is a vast increase in the land put under cultivation.

THE NEW POSTAL LAW.—On page 38 will be found an abstract of the new postal law, and we believe that all our readers will be interested and benefited by a perusal of it. All California letters are now carried for three cents (formerly ten cents), and there are other privileges which will be of interest to every one.

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Correspondence

Balloon Controversy.

MESSRS EDITORS :—On page 246, Vol. VIII. (new series) of the SCIENTIFIC AMERICAN I find a communication relating to my balloon and written by an aeronaut, Mr. John La Mountain, who states as follows :—

"Mr. Shaw claims that he can 'trim' and 'tack ship,' in his air-vessel, as he would with a pleasure yacht, so that with a wind traveling in one direction he can haul close to it and move in another."

I make no such claim, and therefore what Mr. La Mountain has to say about lifting oneself from the floor by the rounds of an arm-chair, while sitting in it, is wholly uncalled-for and gratuitous. What I do claim is this :—That my balloon has a flattened surface on two sides, so constructed and stayed by cords that it will retain its shape ; I connect the car and the balloon with a spur-wheel and pinion, so that the balloon can be revolved independent of the car ; the latter being formed of two cylinders with a pumping apparatus, so that small quantities of the gas may be compressed so as to allow the aeronaut to elevate or depress his balloon at pleasure, without the use of ballast. With the wheel in one end of the car, like the wheel of a wind-mill, I claim that, by revolving it, I will be enabled to check the headway of the balloon and cause a circulation on the flattened surface, thereby enabling me to turn it in any desired direction and move *with* or *out of* the current. It is not my purpose to make head *against* the current, but to so control the direction of the balloon as to go *with* it or diagonally across it ; so that when the balloon strikes a current blowing due east, I may so control its direction (by the use of the wheel) as to travel to the south-east or the south-west ; and to accomplish a similar result when a current is encountered which moves to any of the cardinal points of the compass. In a word, I claim that, by means of the controlling power afforded by this wheel, I can travel west, south-west or north-west in a current blowing directly west ; also east, south-east or north-east in a current blowing due east ; and the same as to the currents blowing to the north or to the south. I do not propose to make head against a hurricane, as Mr. La Mountain intimates, but merely to so far control the direction of my course as to reach any desired point by the *aid* of the currents, and not in spite of them.

The balloon employed by Mr. La Mountain is identical with the original which was sent up from Paris in 1782—nothing more, nothing less. By means of hydrogen and sand-bags he raises and controls his air-ship, and notwithstanding all the "patient and elaborate study" which he has bestowed upon the subject, we find that he has thus far made not the slightest improvement upon the first paper balloon with which Montgolfier astonished the Parisians nearly a century ago. It is not strange that, under such circumstances, Mr. La Mountain should be somewhat jealous of innovations, especially when they emanate from a humble mechanic in an unpretending territory west of the Missouri. But time will vindicate or explode my theory, and I dismiss the subject for the present ; promising that, so soon as a balloon of the proper dimensions can be prepared, with the apparatus for compressing the gas and governing the direction, &c., a test will be made of the practical working of my theory. If it meets my expectations and is found to work well, I trust *the* "aeronaut" of Lansingburgh will "come down" from the high position he has assumed, with less disaster than has sometimes resulted from rapid descents from his aeriel flights.

THOMAS L. SHAW.

Omaha, Nebraska, June 25, 1863.

[We have now permitted each of our aeronautic friends to have a fair hearing through our columns, which must terminate the controversy so far as we are concerned. Let them now turn their attention to the real practical question and see which will be the first to make aerial navigation of some value to the world. These ricketty discussions on the subject amount to nothing.—EDS.

The "Scientific American" in the Navy.

MESSRS. EDITORS :—It is nearly eight years since I first noticed your widely-known publication, under the title of the SCIENTIFIC AMERICAN, and I state with pleasure that I have always been much pleased with it, and I cannot do otherwise than recommend it to every working man for perusal. It brings light to the minds of those who are seeking after scientific truth, and it seems nearly impossible for me to do without it. During my two years' experience with the navy in the South, I made it a part of my business to notice how many of the vessels had the SCIENTIFIC AMERICAN on board, and I am happy to say that I found them on nearly all of them, and in every instance it was spoken of in the highest terms. It is the duty of every earnest reader of the SCIENTIFIC AMERICAN to encourage all within his reach to read it.

PETER SMITH, First-class Fireman, U. S. N.

New York, July 7, 1863.

Will Vulcanized Rubber corrode Iron?

MESSRS. EDITORS:—In reply to the letter of "Civil Engineer," on page 404, Vol. VIII, of the SCIENTIFIC AMERICAN, I would say that vulcanized rubber should never be used when the temperature exceeds that of boiling water. The leakage your correspondent refers to, as having taken place, appears to me to have been caused by the india-rubber packing having been destroyed (or partially destroyed) by the action of the heat ; and the water that was forced through the then-imperfect joint, combining with the fire, caused the destruction of the plate around the joint. Cement should be used to make such joints.

W. T.

Schenectady, N. Y., June 30, 1863.

[Vulcanized rubber may be successfully used at temperatures not exceeding 230° Fah ; at that point sulphur fuses and destroys the union between the rubber and itself.—EDS.

Novel Steamship Machinery.

By referring to the subjoined letter (addressed to the editor of the London *Engineer*) it will be seen that some reporters in this country, who try their "prentice hand" at reports of steamship trials, and who frequently astound the mechanical community with cylinders of "40 inches bore and 40 feet stroke" or similar inaccuracies, have their counterparts in England :—

SIR :—In an account given in the *Times* to-day, of the launch of the London and South-western Railway Company's steamship *Normandy*, I find the following :—

The engines will be supplied with improved surface condensers, arranged with separate cylinders, so that a vacuum can be maintained without the assistance of the main engines.

This I attempt to smooth over by imagining the air and circulating pumps worked by an auxiliary engine. But how am I to explain the following ?—

The boilers are of a large size, fitted with brass tubes, the whole of which are of the feathering description, fitted with wood bushes, and also with the peculiar link motion applied to work the slide valves, so as to enable one man to start and stop the engines without difficulty.

I wish *Mr. Punch* was an engineer ; perhaps he is But, laying aside jokes, can any one conceive the *Times*, with its staff of clever reporters, sending a man (if it did send one) to report on the trial of a steamship, when it is evident he does not know a boiler from a paddle-wheel, and yet it is so, and not only so, but the report is published, and no doubt credited by many as a wonder! If these engineering descriptions are so faulty, is it likely that any other scientific reports given in that paper can be trusted ? I know some of them are excellent, especially those connected with the navy. M. O. A. H.

London, June 18, 1863.

WHY COAL IS DEAR.—The suffering coal-miners who indulge in strikes so often, instigated doubtless by the bulls and bears of the stock market, now earn in La Salle, Ill., the modest amount of from $3 50 to $6 per day of seven hours ; or $1 25 for every tun mined. The president of the coal company states that they have been obliged to pay $1 50 per tun during some parts of the season. The exaction is owing to a combination among the miners in that section of the country, by which they have bound themselves not to work at lower rates. The coal from La Salle is exclusively bituminous we believe.

The New Postal Law.

A new postal law, making a number of important changes in the old system, was passed at the last session of Congress, and went into effect on July 1st. Subjoined is an abstract of the law:—

No mail matter is to be delivered until the postage is paid. Box rent is to be paid one quarter in advance. Letters uncalled-for are to be published in papers having the largest circulation. Letters for foreign citizens are to be published in papers of same language. Letters of value sent to Dead Letter Office are to be kept for four years if the writer cannot be found.

Carriers are to receive salaries from $800 to $1,000 per annum, provided the local letters be sufficient to pay the same.

All domestic letters or transient printed matter, whether passing through the mails or otherwise, must be prepaid by stamps.

The maximum standard weight for single rate postage, is one-half ounce avoirdupois. The uniform rate of postage is three cents per half-ounce, to be paid by stamps. For all drop letters, two cents prepaid for each half ounce or frictional part, but no extra postage or carrier's fee is required.

Where letters are sent without prepayment, double rates will be required before delivery.

Soldiers and sailors may send duly certified letters without prepayment.

When any writer shall endorse upon a prepaid letter his name and address, and a request for its return if not called-for within thirty days or less, such letter shall not be advertised nor treated as a dead letter, but returned, charged with postage at prepaid rates.

Upon regular weekly, tri-weekly, semi-weekly and daily publications and all other regular publications, issued from a known office of publication at stated periods and sent to regular subscribers, postage is required to be paid quarterly in advance.

The maximum standard weight for single postage on printed matter, will be four ounces avoirdupois, the postage on which will be two cents, prepaid by stamps. Rates to regular subscribers payable quarterly in advance for weekly papers, five cents ; semi-weekly, ten cents ; tri-weekly, fifteen cents ; daily, thirty five cents.

Postmasters employing carriers may contract with publishers of newspapers for delivery of same, subject to the approval of the Postmaster General.

No package weighing over 4 pounds can be conveyed by mail, except public documents.

Publishers may enclose in their publications sent to regular subscribers, the bills for subscription thereto without any additional charge for postage, and may write or print upon their publications, or upon the wrappers thereof, the name and address of the subscribers thereto, and the date when the subscription will expire ; but any other enclosure or addition, in writing or in print, shall subject the same to letter postage, which shall be collected before delivery thereof.

AN OSCILLATING CYLINDER LOCOMOTIVE.—The *London Engineer* contains an engraving of a locomotive fitted with oscillating engines, which is entirely novel as regards its actual projection, although the idea has been suggested to us many times. The cylinders are four in number, two in one, on each side ; they are outside connected and supported by the main framing. The motion of the cylinder causes the ports to open for the supply of steam. "The principal object," says the inventor, Mr. Joseph Faulding, "is to obviate the inertia and momentum of the working parts." We do not learn that any steps have been taken towards building a large engine on this principle.

GUNS FOR CHARLESTON.—Orders have been received from the Navy Department directing the shipment to Port Royal of a large number of heavy rifle runs, for our *Monitors*. Several of these immense pieces of ordnance have already been put on board a vessel at the navy yard. They are to replace the 15-inch guns now on board the *Weehawken*, *Nahant* and other armed ships.

IN New South Wales there is a population of 348,000, and 800 public schools, in which 35,000 children are receiving instruction.

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Photography among the Turks.

The following humorous and yet truthful remarks are from the *Daily Telegraph*, London :—

"When mankind has grown wiser, our descendants will smile at the folly which distinguished and decorated the so-called 'reformers' who make a noise in in the world—and not much more—and will transfer their admiration and their honors together to the true revolutionists—the men of science. It is from the closet and cabinet that the movements originate which shake the earth. The chemist, compelling some new element to the service of man, or explaining for him the occult operations of nature; the mechanician, reinforcing his weak muscles with arms of iron and sinews of steel; the geologist, anticipating over his map storehouses of glittering gold, destined to become the origin of empires; the aeronaut, launching his silent bark upon a sea to which the 'unvoyaged Atlantic' of Columbus was a mill-pond; the anatomist, questioning the mind of the Creator himself by comparison of all his works together; the antiquarian, making the dead eloquent, and eliciting from jaw-bones that died in company with mastadon and mammoth, the story of the primeval earth—these, and not the jaunty gentlemen in stars and ribbons, are the men whom history will take note of.

"Photography—almost the latest born of scientific inventions—is a proof of what we mean. At first only the experiment of the savant in his study, it has become in turn an elegant amusement, a trade, and a necessity, until we almost wonder how our forefathers managed to be satisfied with silhouettes and miniatures. It would take all the columns that lie before the reader even to touch upon the thousand and one ramifications of the simple discovery which lies at the base of the art now so widely practiced. Photography has lately assumed a most curious function, namely, that of a religious reformer. If any idea could be pronounced *bizarre* beforehand, it would have been, we should think, that the invention of M. Daguerre could have any possible connection with the decline of Mohammedism, much less conduce to it. There is a well-known song, the wit of which lies in bringing together the most unexpected people, making Æneas play whist with the 'King of the Cannibal Islands,' and Charlemagne dance a polka with Mrs. Fry. Hardly less grotesque must it seem to those who know the habits of the East to read that photography is just now the rage at the 'Sweet Waters,' and that all Constantinople is 'agog' for a portrait of the Sultan. A sharp witted Turk named Abdullah, who has imported the art into the East, has persuaded the 'faithful' to petition his Majesty *en masse* for 'cartes-de-visite' all around; and the Sultan, no ways loath, has consented, it would seem, to be made immortal 'in this style.' Considering that the windows of 'the infidels' are full of the portraits of their charming princesses, and that everybody knows the blood royal by sight as well as his own sisters, it might seem unnecessary for us to criticize the desire of Stamboul. But when it is recollected what Mohammed would have to say about such a thing, and how energetically the Koran, in its heat against idolatry, denounces 'the picture of any created being,' it must be decidedly a sensation to an orthodox Moslem to hear that the Vicegerent of God, the Padishah of all believers, has 'given a sitting.' We get our word 'Arabesques' from the geometrical or running adornment with which old Saracenic and Mussulman art, jealous of any imitative outline, ornamented its books and houses. Now, if the Ulemas don't quickly call the convocation of Islam together and write a number of pastoral letters in the papers, the awful heresy of Abdullah will prevail, and a good Turk will boggle no longer at having his picture taken. Mohammed foresaw a good deal, but not the photographic camera, or there would have been a special chapter in the Koran against that 'device of Eblis'."

WHERE OUR BUTTER COMES FROM.—On Tuesday of last week there were shipped from St. Albans (Vt.) depot 1,565 tubs of butter, and on Tuesday of the present week, 1,468 tubs. The amount of money paid for butter in one week, up to June 20th, has been $14,000. On Tuesday we counted 224 wagons, double and single, on Main and Lake streets, at one time.—*Exchange.*

Utility of Divers in Overflowed Shafts of Collieries.

A correspondent of the *Colliery Guardian* (England) says that an interesting and successful experiment was recently made at the Dearnley Colliery, near Rochdale, under the following circumstances:—"About a month ago, owing to the breaking of the bucket-dagger, the cylinder cover and the engine beams were broken, and during the time required to repair the engine, the water had risen to a considerable height in the shaft. When repaired, the engine worked well till Sunday, the 17th, when it was observed that there was not quite so much water delivered by the pump. This deficiency was more observable on Monday, and on Tuesday it was seen that the pump delivered no water at the down-stroke. It was supposed the bottom valve or "clack" did not close, and other suppositions were made, but they were mere guesses, seeing that some twenty yards of water were in the pit shaft. The engineer remarked that if a diving-bell could be sent down, it would be discovered what was the cause of the pump not lifting. The proprietors of the colliery immediately acted on the idea, and, believing that a diver might be found who would go down and possibly not only discover but remedy the defect in the pump, went immediately to Liverpool and called on Mr. Rodrigues, an employer of divers. After a little explanation, Ellis Javons, the diver who was so successful in the *Royal Charter* wreck, agreed to go over to Dearnley and attempt the repair. He went over with another diver, Thomas Allen; but, after inspecting the pit, they telegraphed for John Bulmer to assist them. A platform was constructed about sixty yards down the shaft, for the air-pump to be worked upon, near to the water. On Thursday morning Javons, being equipped in diver's dress and helmet, was lowered into the water, the pumping engine working very slowly. He had previously very carefully studied the plan of the pump, and had had the possible causes of the defect fully explained to him. Besides the pipe which conveyed the air to the diver, he had a line tied round his body for safety and for signals. After he had been in the water about twenty minutes, a signal was given for the engine to work quick. The diver ascended in half an hour, and brought up with him four or five broken screw-bolts which had fastened the flange of the pump-tree above the bucket door, and he said that when the engine worked quickly the water at the down-stroke came out at the joint with such violence that he was hurled to the side of the pit, and at the up-stroke his whole body was drawn with great force against the opening; and it was observed at the top of the pit that the pump worked well at that time, and it was believed for a moment that he had succeeded in mending the pump. In the afternoon he again went down, taking with him new bolts and a powerful key. He was this time under water an hour and three-quarters, and when he came up said that he had put all the bolts in and was screwing the last bolt when he broke it, and cracked the flange, and this necessitated his again going down on the following morning, which he did, and finished repairing the joint and made a careful examination of the rope, the bucket-door, and the joints of the pump-trees, and all he declared to be in good working order. The engine was set to work, and the pump has worked very well. The diver, the proprietors, and the workmen were all well pleased at the success of the attempt, believing, too, that in similar doubtful cases the services of the diver may be most advantageously resorted to, and a very considerable saving of money and time be effected."

Dieting.

Dieting is usually considered to mean the same thing as a kind of starvation. The idea which the educated physician attaches to the term is a judicious regulation of the quantity and quality of the food, according to the circumstances of each case. A healthy man may diet himself in order to keep well; an invalid may diet with a view to the recovery of his health; yet the things eaten by the two will widely differ in their nature, bulk and mode of preparation. A vast multitude are suffering hourly by the horrors of dyspepsia; no two are precisely alike in all points, since there is an endless variety of combinations as to age, sex, occupation, air, exercise, mode of eating, sleeping, constitution, temperament, &c. Yet dyspepsia is always brought on by over and irregular eating; it could be banished from the world in a generation, if the children were educated to eat moderately, regularly and slowly; the parents who do this will do their offspring a higher good than by leaving them large fortunes, which, in three cases out of four, foster idleness, gluttony and every evil thing. As the rich can get any thing to eat or drink when they want it, they, with indulged children, bring on dyspepsia by eating irregularly and without an appetite The poor—those who have to work for a living—induce the horrible disease by eating too rapidly and at unseasonable hours; mainly by eating heartily at supper and going to bed within an hour or two afterward. In the heyday of youth and manly vigor there may not for a while be noticed any special ill effect from such a practice—in truth, it is at first inappreciable, but it is cumulative and impossible not to manifest itself in due time. Infinite Benevolence forgives a moral delinquency; but omnipotent as he is and loving towards all, it is not in the nature of his government of created things to work a miracle, to suspend a natural law, in order to shield one of his creatures from the legitimate effects of a violence offered the physical system by excesses in eating, drinking or exercise.

Perhaps hearty suppers make more dyspeptics than any or all other causes combined. If dinner is at noon, nothing should be taken for supper but a single cup of weak tea or other hot drink and a piece of stale bread and butter. After forty years of age, those who live in-doors, sedentary persons—that is, all who do not work with their hands as laborers—would do better not to take any supper at all. Half the time the sedentary, who eat at noon, do not feel hungry at supper; especially if they see nothing on the table but bread and butter and tea. But nature is goaded on to act against her instincts in almost every family in the nation by "relishes" being placed on the supper-table, in the shape of chipped beef, salt fish, cake, preserves or other kinds of sweetmeat, and before the person is aware, a hearty meal has been taken, resulting in present uncomfortableness, in disturbed sleep, in a weary waking in the morning, bad taste in the mouth and little or no appetite for breakfast, all of which can be avoided by beginning early to eat habitually, according to the suggestions above made.—*Hall's Journal of Health.*

Strength of Character.

Strength of character consists of two things—power of will and power of self-restraint. It requires two things, therefore, for its existence—strong feelings and strong command over them. Now we all very often mistake strong feelings for strong character. A man who bears all before him, before whose frown domestics tremble and whose bursts of fury make the children of the household quake—because he has his will obeyed and his own way in all things—we call him a strong man. The truth is, that he is the weak man; it is his passions that are strong; he, mastered by them, is weak. You must measure the strength of a man by the power of the feelings he subdues, not by the power of those that subdue him. And hence composure is very often the highest result of strength. Did we ever see a man receive a flagrant injury, and then reply quietly? That is a man spiritually strong. Or did we ever see a man in anguish, stand, as if carved out of solid rock, mastering himself? Or one bearing a hopeless daily trial, remain silent and never tell the world what cankered his home peace? That is strength. He who, with strong passions, remains chaste; he who, keenly sensitive, with manly powers of indignation in him, can be provoked and yet restrain himself and forgive, these are the strong men, the spiritual heroes.

CASTOR OIL ADMINISTRATION.—The medical men of Paris recommend the following way of administering castor oil to children:—The quantity of oil prescribed is poured into a small earthen pan over a moderate fire, an egg broken into it, and stirred up so as to form something like what cooks call buttered eggs; when it is done a little salt or sugar or a few drops of orange water, or some currant jelly should be added. The sick child will eat it eagerly and never discover the fraud.

THE saving banks of New York State now hold on deposit upwards of eighty millions of dollars.

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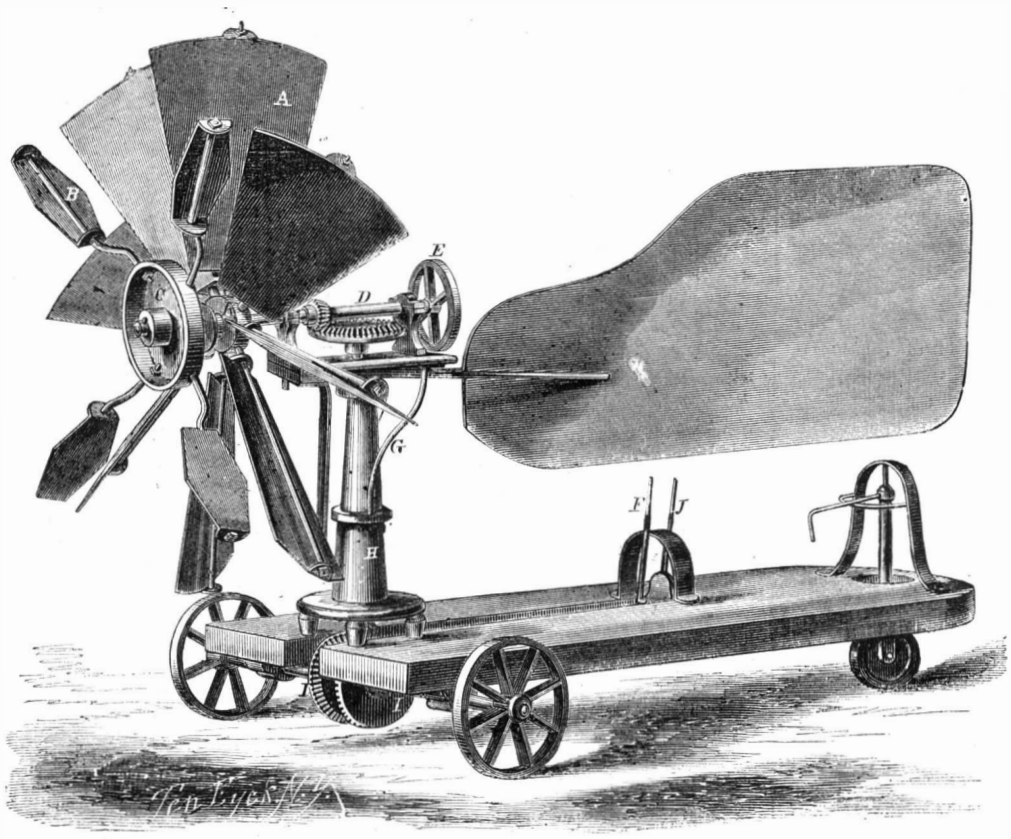
Improved Self-regulating Wind-power.

We published, quite recently, a letter from a correspondent at the West, calling for the introduction of a windmill, or a power of any kind receiving its motion from or through the agency of the wind. We respond to this request by placing before the public the accompanying engraving, which illustrates a very neatly-constructed and well-designed portable windmill, which will be found extremely useful in many places. It can be adapted to plowing, thrashing grain, grinding, or driving any kind of machinery whatsoever.

Annexed is the inventor's description of his machine :—

The hub, C, is keyed on the shaft, D, and has eight arms which carry a similar number of fans; these fans are loose on the arms, and have a small rod on their inner ends running through slots in the hub, C. The hub, C, is keyed on a small shaft running through shaft D, with a friction pulley, E, on the other end. The fans, B, on the regulator hub, C, always stand edgeways to the wind and facing the way the wheel revolves; between the hub K and the hub C is a spring which holds the hub, C, in the right position; said hub, by its connection with the rods to the fans, A, hold them in the right position to take the wind. If the spring holds the hub, C, to run 50 or more revolutions, and yields at that rate by the air reacting on the fans, B, the check-hub, C, and the spring turn the fans, A, edgewise to the wind, more or less, according to the speed at which it revolves. In order to stop the wheel it is necessary to draw on the lever, F; this act raises the brake, G, against the pulley, E; this pulley being on the same shaft with the hub, C, checks the hub and turns the fans, A, edgewise to the wind. When the whole is to be started, release the lever, F, and the spring compels the hub, C, to take the proper position; the wheel will then begin to work. Power can be taken from the wheel by the shaft running down through the column, H; this shaft is connected by gearing at the top in such a manner that it is always in gear, and allows the wheel to turn facing to the wind in the column, H. On the loose end of the said shaft there is a pinion meshing into the bevel wheels, I I. This pinion is shifted from one wheel to the other by a lever, J, which enables the motion of the wheel to be changed ahead or back. Application for a patent is now pending. For further information address Jonathan Troop, at Erie, Pa.



TROOP'S SELF-REGULATING WIND-POWER.

RICHARDSON'S CREAM PUMP.

Butter-making has almost attained to the dignity of a fine art, so many and so varied are the churns, workers, presses, and other tools and utensils employed in its manufacture. Certainly the public cannot complain of any extra care that is bestowed upon the process of butter-making, for too often much of it comes to market in an unsaleable condition. It is often composed of too much hairs and dirt to be desirable, and, either half-worked or over-worked, is not by any means what butter should be. One great cause of its becoming unpalatable, when kept for a short time, is the pieces of unchurned, hardened cream that are worked up in it. These substances escape the general separating that takes place among the fresher quantities of the fluid and pass over into the butter when it is gathered and made ready for the market. It is very difficult, and indeed impossible, to remove these curds at this stage of butter-making, as they cannot be detected by the eye; their presence in the manufactured article induces a chemical change which is highly injurious to the quality and to the market value. The cream pump herewith illustrated is intended to prevent this difficulty, and the object of it is to break up the hardened or dried cream-curds so that they may be easily separated in the churn by the dasher. The machine is very simple; it consists of a tin case, A, fitted with a tube, B, and strainer, C, one side of the case being removed in order to show the interior. There is a bucket, D, in

all respects like that of an ordinary pump, in the tube, and operated by the handle, E, one end of which is fitted with a spur entering one side of the case. The operation of this apparatus is as follows :—When the cream is poured in, it is drawn down into the tube by the action of the bucket, and forced through the strainer at the bottom into the churn below. In the passage all the curds are completely separated, and the whole fluid is homogeneous or of the same consistence throughout, thus preventing any of the evils mentioned previously in this article. Farmers will find this a useful addition to their dairies, as it is recommended by a large number of butter-makers in this State who have used it and know whereof they affirm.

This cream pump was patented on Sept. 23, 1862, by M. A. Richardson, of Sherman, N. Y. For further information apply to Richardson & Keeler, Sherman, N. Y.

CITY RAILS AND CARS.

Under this title a small treatise has been sent to us by the author, who signs himself "Onward," and who advocates the laying-out of New York city with improved rail-tracks, and the entire abolition of horse-omnibuses from the streets. For Broadway, the most central street, he proposes a railway on which the cars shall be driven by steam power, but not with dummies or high pressure locomotives. On this head he says :—"The dummy has its thoughtless advocates; steam directly applied to each car has and is receiving much attention; reserved spring-power has been much talked about; reserved compressed atmospheric air has been named, and lastly manual power has been attempted. My plan is to have any desired number of single cars pass at a suitable speed up and down Broadway without the use of visible power or machinery, and without the clatter of horse or hoof. The arrangement contemplated is nothing else than stationary engines about half a mile distant from each other, located in the basements of houses by the roadside, with vaults extending to the centre of the street, where all the appliances of the steam power can be located and will give constant motion without interruption." This is the plan proposed to operate a street railway in Broadway, with steam power. The details of the method are not given, but it is not an impracticable project. One of the old methods proposed of operating railroad cars with steam was by stationary engines, and for city railways, in some cases, it may be the best mode. It commends itself for one important feature, namely, the free use of the track for passenger cars only.

Models of Iron-clads.—Harrison & Loring, of Boston, Harlan & Hallingsworth, of Wilmington, Del., Chas. Secor, of Jersey, Thos. F. Rowland, of Greenpoint, L. I., Geo. Quintard, of New York and other armored ship-builders, have sent to Washington, within the past few days, models of new ocean iron-clad vessels-of-war, plans for which were invited some time since by Secretary Welles. Almost every theory advocated by newspaper-writers is represented in the huge pile of diminutive craft; but the difference of opinion among builders, which deserves most notice, is that relative to broadsides and turrets. The majority are for turrets, yet some able constructors prefer the old-fashioned broadside. The generality of the vessels are from 3,000 to 4,000 tuns burden.

Michigan Tar.—The manufacture of tar from the pines of Michigan was begun last fall by a party of Norwegians, who have settled at Grand Traverse, and propose to enter extensively into the business. Another party have since then entered into the same business at Sauble River.

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VOL. IX, NO. 3...[NEW SERIES.].....*Nineteenth Year.*

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OCEAN TELEGRAPH LINES.

An international conference has lately been held in Paris, which was attended by representatives from several Governments, for the purpose of examining into the project of a new telegraphic line between Europe and America, by Arturo De Marcoartu, chief engineer of the Spanish corps, who has forwarded to us a short treatise on the subject. In this production its author discusses the merits of the several projected lines for establishing Atlantic ocean telegraphy. The new line is set forth as a universal telegraphic enterprise, not to be under the control of any particular Government, but to be cosmopolitan in its character, open to the people of all nations. It is proposed to commence the line at Cape St. Vincent in Spain and to reach America at Cape San Roque, Brazil, touching at several islands in the Atlantic, which are to form stations, and the whole oceanic line to consist of seven submarine cables of different lengths. It will start from Cadiz, run to the island of Madeira, 616 miles, next to the Canaries, by a section of cable 318 miles; thence to Cape Blanco, 533 miles; then to Cape Verde islands, 652 miles; next to Penedo de San Pedro, 1,009 miles, thence to Fernando Norona, 392 miles; and from that point to Cape San Roque, Brazil, 226 miles. The total length of line by this route will be 3,746 miles divided into seven sections of submarine cable. From Brazil it is proposed to extend the line to New York, by way of the West India islands and Cuba, with a line of six cables having a total length of 4,594 miles, thus making the entire line to New York from Europe 8,340 miles long.

It is undoubtedly much easier to work short than long submarine lines, and some of the intermediate stations on the proposed line are important positions, but compared with the line between Ireland and Newfoundland thence to New York, the expense of constructing it must be prodigious. The longest section of a cable required on this old route is 2,200 miles, while there are three sections of cable required by the new route, each of which exceeds 1,000 miles in length. If a cable can be laid and worked successfully between Ireland and Newfoundland, this will form the cheapest and most advantageous route. It is now known that the old Atlantic cable was defectively constructed, and it is asserted that, by recent improvements in the construction of cables and in apparatus for working them, no difficulty will be experienced in laying and operating the long line of 2,200 miles; therefore we hope it may soon be commenced and carried out with vigor and success. No person, however, can object to the objects endeavored to be secured by the newly-proposed line of M. De Marcoartu, namely, a universal enterprise of a cosmopolitan interest. We would like to see several ocean-telegraph lines established, if there were sufficient business to render them necessary and remunerative. Every commercial tie of this character which binds nations together exerts a beneficial influence.

There are forty-five submarine telegraph cables in operation. The first was laid between England and France, a distance of 25 miles, in 1851, and has thus been twelve years in operation. The longest, between Malta and Alexandria, is 1,535 miles long and has been in operation about one and a half years. The success of this line affords a guarantee for the proposed line between Ireland and America, which will require a cable of only 665 miles greater length, but the distance between the two shores is not quite seventeen hundred miles.

ARE SCRAPED SURFACES INDISPENSABLE?

In stating this question as broadly as we have done, we disclaim at the outset any intention of dispensing utterly with scraped surfaces, or of erasing from the vocabulary of mechanical technicalities this detail of the workshop. The doubt has arisen in our mind whether much of the time and elaboration expended on scraping iron surfaces might not, without injury to the work itself, be omitted. The value of a positively correct face on a valve seat or on the V-shaped ribs of a slide lathe or planer, is undoubtedly great when it is well done, but when poorly executed the utility of it is, to say the least, questionable. We make the unqualified assertion that not one man in twenty is competent to finish a truly scraped surface. Scraping iron down to a perfect face is an art b itself, and comparatively little attention, so to speak, has been given to the subject in this country. The common method in use is to take an old file of any kind (except round or square), flatten its end out like a chisel, grind it up square on the stone, and then "grub" away on the iron wherever the workman sees fit. The chances are that previous experience has not fitted the operative for this branch of his business, and he mistakes a shade on the iron for a bearing and makes a depression still deeper by misapprehending the "situation." Of course the fallacy of attempting to make a true face in this way is manifest to every one familiar with the subject. It would have been far better to have saved the time wasted in such attempts and trust to good planing and attendance in future to rectify inaccuracies.

The better way to make a scraper is to form it like a Venetian stiletto, or, more familiarly, after the model of the section of a beech nut; that is, to have the blade triangular in section, and approaching concavity. With such an instrument, properly tempered, ground, and sharpened, the finest work can be produced. A flat-faced scraper is an abomination, and only fit to dig holes or to rough out the work for the triangular scraper; it is apt to make "chatters" in the surface, and when these occur we may bid a long farewell to any fine work without filing them out—a very pretty task to undertake after something like accuracy has been attained. Most scraped surfaces are nothing but a combination of scratches, shining blotches, and untruth; and while they are a waste of time to execute, they add nothing to the mechanical value of the work. We may fairly question whether valve-seats up to 180 square inches of area, say 15 inches by 12 inches, are benefited by scraping. In some locomotive-shops in this country it is the practice to plane the valve-seat so that the tool-marks on it run in one direction, and place the valve so that similar marks in it cross the seat at right angles, and to set the valves running in this way without further adjustment. The results observed are that in a few days the valve has made a seat for itself that is far more durable than if it had been badly scraped. We do not go so far as some persons and assert that a scraped valve-seat is a positive injury, insomuch that the pores of the iron are filled with an impalpable dust that works out to the detriment of the engine in future; this theory is very finely drawn, although it may be partly sustained by facts. A finely-finished mirror-like surface on a valve-seat or lathe shears is indubitably of great value, and we must, in common justice, give credit to English workmen for great skill in this particular; in general they far excel our own workmen.

There is no reason whatever to interfere with the execution of a finely-elaborated scraped surface in our own shops; but our observation convinces us that time spent in doing such work as we have seen, might be better employed in some other way.

RIFLE CLUBS.

If the present war has demonstrated anything it is the want of independent military organizations—independent, yet so far subordinate to the State Government that they can be mustered into service when the public weal demands it. The particular kindo organization that we have in view in making this suggestion is a "rifle club." If we required precedent, as a nation, for taking such a step, or at least making the proposal, the example of the English, Swiss, and German nations may be cited in evidence of the popularity with which such a system is regarded abroad. Similar bodies of militia, so to speak, are also recruited in France, but they are by no means popular convocations, and are under the surveillance of the authorities. With a profound sense of the necessity which exists among ourselves for the recruiting and forming of such companies, we unite an earnest desire to see our suggestion acted upon without delay. Any person at all conversant with the history of the hour can readily perceive the inestimable value of such bodies of men and the practical use to which they could be put. Riflemen in particular are the most efficient infantry in the world when properly handled, and all generals take special care to guard against exposing their troops to their galling fire. Mechanics make the best riflemen in the world, as they do also the most versatile soldiers. The record of the war is full of instances wherein tradesmen have thrown down the musket, turned sappers and miners, completed their labors in this line, and then resumed their guns and fallen into the ranks again. They have been ready to attack the enemy either with spade or musket, and have skilfully and cheerfully performed labors, against time, that were not within the legitimate range of the particular corps to which they belonged. If these glorious achievements can be cited of those artisans now in the ranks, why can we not, in perfect confidence that our voice will be heeded, call upon other workmen still at home to organize bodies of riflemen, to form themselves into clubs of home-guards, and be willing to defend that home, either on its doorstep or 5,000 miles from it? Steady of hand, keen of vision, and stout of heart, no better materials than our mechanics can be found for the formation of a band of defenders, that shall be such in reality. In some instances military organizations have contented themselves with parades, holiday affairs, suppers, camping out in the woods of some watering-place in close proximity to a fine hotel, in short, doing everything except face the foe. We are confident that no such short-comings as these could be recorded against regiments of hard-fisted, stout-hearted workmen, and we urge them, in whatever State of the Union they may be, to take steps to form companies without delay, for at the present writing there is no prophecying when they may not be needed.

A CAVALRY HELMET WANTED.

Any person who reads the reports of cavalry skirmishes and pitched battles, and knows the havoc created on both sides by the skillful use of the sabre, cannot but wonder that some light and efficient protection for the dragoon's head has not been proposed to the Government. We have had bullet-proof vests, which, in more than one instance, have saved the lives of the wearers. The principles involved in their construction should be carried out still further, and the head, as much the seat of vitality and energy as the heart, protected from assault, covert or open. Of course, we do not allude to any such ponderous affairs as Sir Brian Du Bois Guilbert wore in his tilts and tournaments, which weighed twenty pounds, more or less; but the sort of protective headgear we have in mind is a light steel plate set on an elastic skull-cap. Let the plate be conical in shape, hard enough to resist indentation, and then, armed and equipped with this, the enemy who should be rash enough to smite the wearer would be doubly foiled; his own arm would be lamed by the glancing and wasted force of his blow, and the helmeted trooper would also be unharmed. Such a helmet would be attacked instantly by the enemy until they found aggression useless; for the temptation to knock off a man's hat is always irresistible, especially if he has on one of a singular appearance. It would also add to the *tout ensemble* of a squadron if it was made bright and neat in appearance, and in many ways would be highly desirable. The helmet need not weigh as much as a fireman's hat and would be a most efficient protection. It would not only save the head, but in most cases would protect the shoulders from injury, as it would be difficult to deliver an undercut in a general mêlee that would disable a

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horseman. The head is the first point, however ; let us have that protected and the efficiency of the cavalry will be doubled. Who will introduce a cavalry helmet?

GREATER ECONOMY IN COAL CONSUMPTION DEMANDED.

The exorbitant demands of the coal-dealers are causing a universal inquiry into the justice or necessity of such prices as are exacted. We have seen no evidence adduced that is worthy of a moment's attention, which could justify the enormous advance of this article of prime necessity, although it has been urged that the strikes of the miners and inadequate facilities for transportation are insuperable obstacles to a reduction of the price. If the public cannot succeed in inducing the coalition—for there evidently is one somewhere in the coal interest—to abate one jot of their exactions, they may at least coöperate with us in calling forth, and employing when brought to light, improvements in furnaces of all descriptions, whether for steam purposes, culinary use, or warming apartments. It is a notorious fact that a large part of the fuel, whether wood or coal, daily used, is not economized as it should be, either in burning it or in using it after it has passed through the fire. Although American stoves and furnaces rank deservedly high for apparatuses of their class, yet we think the most sanguine inventor who has ever investigated the subject will admit that there is room for improvement, and that too many of the stoves and ranges now in use devour fuel as greedily as if their proprietors held the fee simple of a coal mine. The actual value of a stove, furnace, or steam boiler depends upon the arrangement and amount of surface exposed to the action of heat, and so contrived that the greatest possible amount of caloric will be extracted from the ignited gases before they pass up the chimney. The heat, at a reasonable distance from the stove, which passes off into the air through the pipe unused, is a proof that more fuel is burned than the stove can work to advantage, and also that money is expended for which there is no return. The same is the case with steam boilers ; although we do not anticipate that the currents passing through the chimney—that gases liberated by combustion will be so cooled that the smoke-pipe will answer the purpose of a refrigerator—yet we do expect that vital improvements will be made so that the heat which issues from the smoke-pipe will not be so great as to burn out the top of the same in a short time, sixty feet or more from the furnace.

We remarked at the commencement of this article, that fuel, more particularly coal, was not generally used after it had once passed through the fire. Such is the fact. All of the coals are not subjected to the same heat alike, and some are reduced to cinders and ashes while others are only roasted or calcined and turned into coke. This refuse, so-called, properly screened and picked out, makes an excellent summer fuel, easily ignited, and gives heat enough for ordinary purposes, and it is inconceivable why so many persons throw away their ashes, and with it certainly a tenth of their coal account. Such waste is reprehensible and ought to be checked, and we hope ere long to chronicle a great addition to the list of improved coal burning apparatuses.

THE ENGLISH STEAM FIRE-ENGINE TRIAL.

In a conversation we had recently with a celebrated builder of steam fire-engines in this city, he expressed the opinion that, in the forthcoming trial to be had in London, our engines would prove victorious in point of distance to which water could be thrown The English are very partial to the quantity of water projected in a given time, as a favorable quality of a steam engine, and all their machines have a much less proportion of steam area in the pistons than have ours when the relative size of the pumps is taken into account. The *Manhattan* steamer, of this city, is considered a favorable exponent of the American steam fire-engine, but it is said that the English engineering community do not look upon the rotary pump with much favor. We think this rather anomalous, considering the merits accorded to the Gwynne centrifugal pump, and the changes rung upon it by all English journals, from those competent to criticize its qualities down to others who do not know the difference between a rotary pump and a penny whistle. We have expected to see some English fire-engine fitted with this pump, and a trial had of its virtues or advantages over the Carey pump, such as is the *Manhattan's;* there may be some engine of this kind entered for exhibition, but we have been given to understand that the English machines are all fitted with reciprocating pumps. A large proportion of our mechanics are away at the war, fighting for their country, but those who remain will look eagerly for the result of the trial, as they expect to see the confidence they have placed in their machines fully sustained.

THE DISCOVERERS OF THE SOURCE OF THE NILE.

Captains Speke and Grant, whose discovery of the true source of the Nile was formerly noticed in our columns, have arrived in London, and were publicly received by the Royal Geographical Society on the evening of the 23d ult. Sir Roderick Murchison introduced the two travelers, who addressed the meeting and gave an interesting account of their discoveries and adventures. They were attended by two boys, aged about 15 years, natives of the country, who were brought to England with the consent of their parents to receive a good education and then be sent back to their native clime. Their skin is black and their heads covered with the usual coat of wool, but their features are regular, their noses being straight and foreheads as high as those of Europeans The races in the region of Lake Nyanza (Captain Speke believes) are descended from the Abyssinians and Hindoos. The men are tall and well made, and they are honest and friendly.

When Captain Speke visited the king of Uganda, his sable majesty said he must sit on the ground and wait until he was given an audience. The captain answered that he was a prince and was not accustomed to wait ; and he terrified the king and his whole court into submission by opening his umbrella, which they took to be a deadly weapon employed for killing by magic.

Lake Nyanza, the source of the Nile, is situated at an elevation of 3 500 feet above the level of the sea, in latitude three degrees south, and from where the Nile leaves this lake until it reaches the Mediterranean Sea it traverses a distance of 3,000 geographical miles. The lake is in the region of the Mountains of the Moon, in the middle of the rainy zone where, in 1862, Captain Speke noticed that rain fell, more or less, during 233 days of the year. This accounts for the perpetual supply of waters to the Nile. At the center of the northern coast of the lake the parent stream of the Nile issues over a precipice twelve feet in hight. The travelers proceeded down this branch from Lake Nyanza, and after many delays and incidents reached Rhartown last spring ; the time of their travel having occupied two years and a half, and the distance explored being 3.000 miles.

OUR "BRANCH OFFICE" AND THE WAR.

At the beginning of the invasion of Pennsylvania the necessity of "uncovering" Washington became a fixed fact ; but to leave it unprotected, while the army of Gen. Meade went forth to drive back the forces of Gen. Lee, might result in its possible capture by Gen. Beauregard's forces, which were understood to be "on the move" from Richmond to aid the rebel army of invasion. To provide against this exigency the President called into the service for sixty days—unless sooner discharged—every able-bodied man between 18 and 45, within the limits of the District of Columbia. The entire force employed in the Washington "Branch Office" of the SCIENTIFIC AMERICAN was called out, and, we are happy to know, went cheerfully to meet the summons. At one time it seemed to us that we should be compelled—for a short time, at least—to close our efficient "Branch Office." We are much pleased to learn, however, that the President considers that the exigency no longer exists, and all our Washington *employés* are now following their accustomed duties in our service.

THE ram *Atlanta* has been pronounced unseaworthy by an examining board from our navy at Port Royal. She has six inches of water in her hold, and a steady leak is observable in the place where the iron-work is fastened to the hull. Her guns are all marked "Tredegar Iron-works, Richmond," and one of them is of this year's casting.

KRUPP'S PRUSSIAN STEEL-WORKS.

At the recent great International Exhibition in London, the products of the immense steel-works of Frederick Krupp, at Essen, Prussia, attracted great attention from scientific and practical men of all countries, by reason of the character and class of articles made at that establishment. Steel crank-shafts forged solid, double throw, are produced weighing 12 tuns and over ; cast-steel guns of the largest bores and the finest possible texture are turned out according to contract in large numbers. The Russian Government are now having 100 steel breech-loading guns made, of 11¾ inches bore, and weighing approximately 16,666 pounds, at an aggregate cost of 500.000 thalers. (A thaler is 70 cents.) Our own Government has also ordered a 7½ inch steel gun, Dahlgren pattern, to experiment with. Every kind of steel forging that can be named is made by Krupp ; and his steel tires for locomotives are especially commended by all who have used them. The tires for locomotives are made without a weld, and are calculated to run from 80,000 to 100 000 miles without turning ; and when turned up they lose but ¼ of an inch of metal. The "life" of a 2-inch tire is usually computed at about 250.000 miles on an average. Cast-steel ingots are produced weighing 40 tuns, which are forged under a steam hammer of 50 tuns' weight, having a fall of 10 feet. The cannon have undergone trials at Woolwich (England) which have proved that they cannot be bursted, so exceedingly tough and well wrought is the nature of the metal. Nearly all the Governments in the world have ordered some cannons from Krupp's works. A bolt, 8 feet 9.5 inches long and weighing 1.000 pounds, was fired from one of Krupp's patent breech-loaders, without injury to the gun or breech-loading apparatus.

The works are located near the Rhine, about 50 miles below Cologne, on the opposite bank of the river ; they cover nearly 200 acres, about one-tenth of which are under roofs. The consumption of coal is about 250 tuns per day ; the coal is obtained in the immediate neighborhood.

Mr. Krupp's New York agent—Mr. Thomas Prosser, of 28 Platt street, this city—has large lithographs representing Krupp's works and other matters connected with that establishment, all of which are very interesting.

TESTING ORDNANCE.—For several weeks past, a thirteen-inch gun, of Rodman's model, cast at Fortress Monroe, has undergone a series of experiments. Its weight is 33 615 pounds, and it is fourteen feet long. A two-hundred-and-seventy-five-pound shot has been fired, with a charge of thirty pounds of powder, and, as yet, there is no perceptible enlargement of the bore, though the piece has been discharged nearly three hundred times Thus far the experiments have been confined to trying the gun's durability ; but, in a few days, the test will be made as to the distance and penetrability of the projectiles thrown.—*Pittsburgh Dispatch.*

THE ship *Resolution*, in which Captain Cook left England on his second voyage round the world in 1772—ninety years since—is now at Demerara waiting a cargo of sugar.

THE amount of money found in letters at the Dead Letter Office, during the last year, was over $80,000, being an excess of $30,000 over the previous twelve months.

DIVERS have already succeeded in securing $40,000 worth of goods, and raised one box containing $32,000 in specie. from the wreck of the *Anglo-Saxon*, off the coast of Nova Scotia.

IT is estimated that the aggregate yield of the California gold mines, since the discovery of gold in 1846, is twelve hundred and fifty millions of dollars.

ASSISTANT-SECRETARY OF THE NAVY, FOX, states that the whole number of vessels captured or destroyed by the blockading fleet up to June 1, is 855.

UPWARDS of £300.000 have been subscribed in England to the Atlantic telegraph, and it is said that the work is to be prosecuted immediately.

IT is said that a bank-note printed in blue on a yellow ground is the only one which cannot be reproduced by photography.

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RECENT AMERICAN PATENTS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week. The claims may be found in the official list :—

Brick Machine —This invention consists in the use of a cylindrical mold provided with sliding plungers and fitted in a mounted frame on which a mixing or tempering device, scraper, sand-box and frame-elevating device are placed ; the several parts being arranged in such a manner that the machine may be used either stationary for mixing or tempering and pulverizing the clay and molding the same into bricks, or be drawn along and operated by traction so that the work referred to may be performed and the molded bricks also properly distributed or laid upon the yard. J. N. Newell, of St. Louis, Mo., is the inventor of this brick machine.

Shingle Machine —This invention relates to an improved shingle machine of that class in which a circular saw is employed for cutting the shingles from the bolt ; and it consists in the employment of a horizontal circular saw in connection with a sliding frame provided with clamps or dogs, arranged in such a manner that the latter may be conveniently manipulated in connection with the frame and the bolt from which the shingles are cut, and fed with the greatest facility to the saw and withdrawn therefrom. The invention also consists in the employment of supporting bars so arranged relatively with the saw and the bed on which the bolt is moved and adjusted, that the shingle, while being cut from the bolt, will be fastened or held in proper position and a clean smooth cut obtained the whole width of the bolt. The invention further consists in using, in connection with the saw, supporting bars, and the clamps or dogs, a bed arranged in such a manner as to admit of the bolt being very readily adjusted to have the saw cut the shingle in proper taper form Simeon Heywood, of Claremont, N. H., is the inventor of this improvement.

Weapon of War.—This invention consists, first, in the combination with a lance of a revolving many-chambered cylinder of similar character to that commonly used in revolving fire-arms arranged to rotate upon the pole or shaft of the lance, by having the said pole or shaft passed directly through it. It also consists in furnishing the so-applied many-chambered cylinder at its rear end, with a circular series of ratchet-like teeth, corresponding in number with its chambers, and in fitting the lance pole or stock with a sliding hammer so formed and arranged that by turning the cylinder upon the said pole or shaft, the said teeth may be made to force back the said hammer in such a manner as to permit it to be driven forward again by a suitably applied spring, and thereby caused to strike upon percussion caps or their equivalents applied in rear of the several chambers, for the purpose of firing the charges of the said chambers one at a time and in regular succession all round the cylinder. It also consists in fitting the butt of the pole or shaft with a spike which can be sheathed by being packed into the pole or shaft when the weapon is to be carried or used, and protruded from the butt to enable it to be driven into the ground to hold the weapon in an upright position ready to be quickly laid hold of when required for use. This weapon is suitable for arming either infantry or cavalry but especially for infantry. J. C. Campbell, of New York, is the inventor of this weapon.

Reclaiming Exhaust Steam.—This invention consists in a certain arrangement of a rotary fan in combination with a box or chamber containing a series of parallel radiators into which the exhaust steam from an engine is delivered, whereby air is drawn copiously and directly through the intervening spaces between the said radiators for the purpose of carrying off the heat from and effecting the condensation of the steam, and the said air heated by the heat abstracted from the steam is conveyed to the boiler furnace or other apparatus where such heat may be utilized. A. C. Fletcher, of New York, is the inventor of this improvement.

Cutting out Bayonet Scabbards.—The object of this invention is to cut up a piece of leather or other material in pieces suitable to make scabbards for bayonets. The invention consists in the arrangement of two sets of knives secured in oblique directions in the surfaces of two rotary cylinders, at such distances apart that the spaces between the knives on each cylinder correspond in shape and size to the blank required for a scabbard, the two sets of knives being inclined in opposite directions, those in one cylinder toward one and those in the other toward the opposite direction, in such a manner and in such relation toward each other that by the action of the two sets of knives, the blanks are cut out out with both edges beveled off toward the same, say the flesh side of the skin, where leather is used and that the same can be bent up and the edges secured together, producing a flat seam. Henry D. Smith, of New York, is the inventor of this improvement.

Siphon Filter.—The usual mode of emptying a blow-up pan is to melt the sugar in the pan and draw the sirup or liquor at or near the bottom through a strainer, thus first drawing off the dirt. The object of this invention is to draw off the sirup from the surface where it is clear, and allow the dirt to settle at the bottom of the pan, to be shoveled out after the sirup has been all discharged, and to this end it consists in a flexible pipe or a pipe with flexible or folding joints, with an outlet through the bottom of the pan and with a float and strainer at the top, the float remaining at the top of the sirup or liquor and keeping the strainer just below the surface thereof and the pipe connecting with the strainer in such a manner that the sirup or liquor passes through the strainer before entering the pipe. C. N. Brock, of Philadelphia, Pa., is the inventor of this improvement.

Nail Plate feeder.—J. S. Fisk, of Youngstown, Mahoning county, Ohio, has recently invented an automatic nail plate-feeder, which is highly spoken of by those who have witnessed its operations as a machine of great merit. The mechanical construction of the machine is of the first class and gives evidence of inventive talent of a high order. Letters Patent for this invention were granted through the Scientific American Patent Agency on June 30, 1863, and an engraving will appear in this paper so soon as it can be prepared.

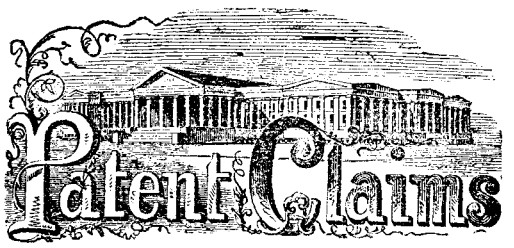
An Immense Breech-loading Gun.

Our readers will recollect that some months ago we noticed the construction here of a steel breech-loading gun, the invention of Mr. Mann, capable of being discharged with the most extraordinary rapidity. The gun was taken to Washington and gave such satisfaction in its trial there, that Mr. Mann was commissioned to make one of the largest size on the same principle. He has been at work on the new piece for several weeks, and it is now so near completion that in a very short time it will be ready for service. The new gun will throw a ball of the elongated pattern, weighing one hundred and fifty pounds, and will, it is stated, have a range of some four miles! It can be fired with ease, and without the slightest danger, one hundred times in as many minutes, and is so simple in all its parts that it will be almost impossible for it to get out of order. It is the largest breech loading gun ever made in America, and its trial will be looked for with more than ordinary interest.—*Pittsburgh Chronicle.*

Chemical Dangers.

M. Rouelle, an eminent chemist, was not the most cautious of operators. One day, while performing some experiments, he observed to his auditors, "Gentlemen, you see this cauldron upon the brasier; well, if I were to cease stirring a single moment, an explosion would ensue which would blow us all in the air." The company had scarcely time to reflect upon this comfortable piece of intelligence before he did forget to stir it, and his prediction was accomplished. The explosion took place with a horrible crash; all the windows of the laboratory were smashed to pieces, and two hundred auditors whirled away into the garden. Fortunately none received any very serious injury, the greatest violence of the explosion having been in the direction of the chimney. The demonstrator escaped without further injury than the loss of his wig.

THE continent of Africa contains over 11,000,000 square miles—being three millions more than the whole of North America.



ISSUED FROM THE UNITED STATES PATENT OFFICE

FOR THE WEEK ENDING JUNE 30, 1863.

Reported Officially for the Scientific American.

*** Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

39,024.—Rifling Fire-arms.—E. G. Allen, Boston, Mass. :

I claim the method of rifling or grooving the barrels of fire-arms by combining the irregular gain twist, as hereinbefore described, with the shallow curved depression, substantially as herein shown and set forth.

39,025.—Machine for breaking and dressing Flax, &c.—S. M. Allen, Woburn, Mass. :

I claim, first, In combination with a series of fluted rollers geared by a revolving fluted drum, two fluted rollers so arranged as to engage with and be geared by respectively the first and last drum-geared roller, substantially as and for the purpose herein set forth.

Second, The combination of a series of fluted rollers arranged about a central fluted drum with one or more pairs of clusters of revolving stripping or scutching blades, arranged for operation substantially as herein described.

Third, The combination of two or more pairs of revolving scutching blades, with intermediate check rollers, arranged and operating substantially as herein described.

39,026.—Nursery Chair.—A. B. Anderson, Jr., Brooklyn, N. Y. :

I claim, first, The use or employment of the secondary frame work, B, in combination with the frame-work, A, when arranged and operated as herein shown, for the purpose specified

Second, Holding the frame-work, B, in position, when the same shall be elevated in the manner and by the means herein fully described

Third, In combination with the cam-shaped pieces provided with the pins, I claim the sockets provided with the openings, for the purpose fully set forth.

Fourth, In combination with the frame-work, Q, I claim the use or employment of the slotted center pieces, K, and side arms, N, for the purpose shown.

Fifth, In combination with the same, I claim the frame-work, Q, operated as shown for the purpose specified.

39,027.—Fruit or Preserve Jar.—J. S. & T. B. Atterbury, Pittsburgh, Pa. :

We claim, first, The combination metallic and rubber annular band, d e, constructed in the manner and for the purpose described.

Second, The combination metallic and rubber band, d e, in connection with the beveled-edge jar cover, B d, and jar, A, in the manner and for the purpose described.

39,028.—Drag Saw.—James Bailey, Prairie Township, Ind. :

I claim, first, The arrangement of the inclined frame pieces, A A, in combination with the upright stand, B, front and back sills, C and D, and braces, F F, in the manner described and for the purpose herein specified.

Second, I claim the truck wheels, S S, and handles, T T, in combination with the arrangement of the guide, F, and braces, G and H, and saw-blade attachment, substantially in the manner and for the purpose herein specified

Third, I claim the connecting link, C, Figs. 2 and 3, in combination with the pitman strap, A, and saw-blade strap, B, in the manner and for the purpose herein specified.

39,029.—Washing Machine.—S. M. Barnett, New York City :

I claim, first, The arrangement of the reciprocating cross-head, E, provided with rubbing rollers, d, and swinging soap-box, G, and moving in the slotted hinged frame, C, which is adjustable by a treadle, D, in the manner and for the purpose substantially as shown and described

Second, The adjustable spring, f, in combination with the soap-box, G, as and for the purpose set forth.

Third, The feed arms, H, in combination with the reciprocating rubber head, E, and soap-box, G, substantially as and for the purpose specified.

Fourth, The arrangement of the swivel arm, M, with the furnace, r, in combination with the frame, A, which carries the wash-board, B, as and for the purpose described.

[The object of this invention is to imitate by machinery the action of hand-washing, spreading the clothes to be washed, one after the other, on a corrugated or fluted wash-board on which the soap is applied and the rubbing performed, while, at the same time, the piece to be washed is fed along, causing the soap and rubbers to pass gradually over its entire surface.]

39,030.—Granary.—A. C. L. Devaux, King William-street, London, England :

I claim the grain receptable, A, when made with perforated walls and an air space between the receptacles, in combination with the central perforated air tubes, B, as herein shown and described.

The lateral air-pipes, C, in combination with the central tubes, B, and receptacles, A, as herein shown and described.

[This invention relates to a novel construction of granaries by which perfect preservation of the grain placed therein may be insured by means of natural aeration combined with artificial ventilation. The operations of natural aeration and artificial ventilation may be employed, either separately or in combination, according to the requirements of the case.]

39,031.—Siphon Filter for drawing Sirups, &c.—C. N. Brock, Philadelphia, Pa. :

I claim having the filter or filtering drawer, C, constructed with the float, D, immediately above it, in combination with the jointed pipe, B, all in the manner herein shown and described.

39,032.—Combined Pike and Revolving Fire-arm.—J. C. Campbell, New York City :

I claim, first, The combination with a lance of a many-chambered cylinder of similar character to that of a revolving fire-arm, fitted to rotate upon the pole or shaft of the lance, substantially as herein described.

Second, The combination of the series of ratchet-like teeth on the rear of the so-applied many chambered cylinder, the sliding hammer and the spring, substantially as and for the purpose herein specified.

Third, The movable spike fitted and secured in the butt of the lance, pole or shaft, substantially as and for the purpose herein specified.

39,033.—Tape Fuse.—J. E. Chase and Joseph Toy, Simsbury, Conn. :

We claim the employment, as a covering for fuse, of tape composed

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of two warps and an interposed lap of cotton or other fibrous material, substantially as herein specified.

[This invention consists in the employment, in the manufacture of tape fuse, of a new kind of tape composed of two warps or series of parallel yarns and an interposed thin lap of cotton or other fibrous material united by sizing.]

39,034.—Boot-tree.—W. C. Clark, Baltimore, Md. :

First, I claim the construction and employment of a lever staff or "calf-stretcher piece," f f, formed with the double incline surfaces, g g h h I, and provided with the elongated slot, j, by which said lever staff is adjustable up and down, in and out, and whereby the leg, heel, instep or toe of the boot may be acted on separately, by one single horizontal hand, n o, substantially in the manner as set forth and described.

Second, I also claim the employment of an adjustable sliding stop piece, d d, attached to the tibia or shin block, a a a a, together and in combination with the horizontal tightening screw, n o, and lever staff piece, f f g g h h i j, for the purpose as herein set forth and described.

Third, I also claim the construction of the attachable, angular or wedge-shape last, s s s s, together with the attachable; side-stretcher blocks, q q q q, when combined, employed and operated in connection with the lever staff, f f g g h h i j, substantially in the manner and for the purpose set forth and described.

Fourth, I claim the employment of adjustable collars, p p p p, when combined and used with the adjustable lever staff or calf-stretcher piece, f g h i j, for the purpose and in the manner substantially as set forth and described.

39,035.—Churn.—L. S. Colburn, Oberlin, Ohio :

I claim the above-described dasher, having the flat oblique beater and the broad horizontal shaft, constructed and operated substantially in the manner and for the purposes set forth.

39,036.—Water Elevator.—James E. Cronk, Poughkeepsie, N. Y. Ante-dated Jan. 10, 1863 :

I claim the combination and arrangement of the shaft, J, loose roller, G, ratchet, N, or its equivalent, and sliding tube, M, substantially as described.

39,037.—Planing Machine.—Lafayette Doolittle, Bushville, N. Y. :

I claim the stationary knives or planes, D D, and pressure rollers, E E, in combination with the reciprocating plate or head, G, and the stops or gates, J J, all arranged for joint operation as and for the purpose specified.

I also claim the curved bar, K, when applied to the platform, B, and in such relation with the planing mechanism as to discharge the shingles or other articles planed, laterally from the machine, as set forth.

[This invention consists in the employment of two stationary cutters or planers, a reciprocating head or plunger, pressure rollers, and vertical stops or gates, all arranged in such a manner that shingles, pickets and like articles may be planed in a perfect and expeditious manner.]

39,038.—Steam Engine.—N. T. Edson, New Orleans, La. :

I claim, first, The using of a steam-chest for a slide valve, in combination with the roller, g, plate, h, and stay, J, substantially as set forth.

Second, The joint, Fig. 3, in combination with the plate, 4, by which the gland, 2, is held against the packing.

Third, The combination of the eccentric frame, m, and block, o, for the purposes specified.

Fourth, The combination of the eccentric rod, p, governor rod, u, angle lever, v, and lever, r, when acted upon by the governor to regulate the speed of the engine.

39,039.—Wringing Machine.—Lucius Evans, Fayetteville, N. Y. :

I claim the arrangement and combination of the cross band and pulleys with elastic rollers, when arranged and combined with the elliptic springs, K, and the sliding boxes, I, as herein described and for the purposes set forth.

39,040.—Condenser for Steam Engines.—A. C. Fletcher, New York City :

I claim the arrangement of the rotary fan to draw the air directly through the box or chamber, B, and between the radiators, A A, without the intervention of pipes or passages, substantially as and for the purpose herein set forth.

39,041.—Heating Apparatus.—E. C. Gillette, San Francisco, Cal. Ante-dated Feb. 21, 1863 :

I claim, first, The urn-shaped vessel, I, annular perforated ring, d, concave sprinkler, n, and water vessel, J, arranged in combination with the air chamber and operating in the manner and for the purpose described.

Second, The arrangement of the upper and lower compartments, B D, having ingress and egress openings, K L, communicating with each other through the flues, b, in combination with the cold air pipe, G, air chamber, C, and exit tube, H, when used with the vaporizing apparatus set forth in the preceding claim, substantially as described.

[This invention relates to a stove attachment for warming and ventilating buildings and consists in the peculiar construction and arrangement of parts, whereby the smoke and gases escaping into the chimney are made to heat fresh air and the same is introduced into the apartment in a suitable state for healthy respiration.]

39,042.—Oven.—P. J. Gindre and John Doerler, Cincinnati, Ohio :

We claim, first, The arrangement of the oven, A, placed concentrically within and entirely enveloped by the portable furnace, B, in combination with a cart or wagon, substantially as set forth.

Second, A portable oven circular in its horizontal section and having an elevated and revolving floor, E, capable of discretionary ventilation on its under side, as and for the purposes set forth.

Third. We claim, in the described adaptation to a portable oven, the ventilating chamber, a″, interposed between the floor, E, and bottom, a′, of the oven proper, and having registered communications, F f, with the external air, substantially as and for the purposes set forth.

39,043.—Fire Grate.—W. D. Guseman, Morgantown, Va. :

I claim the damper, G, when arranged as shown and used in connection with the flue, F, the sliding blower or screen, D, and the front and bottom grates, B C, as and for the purpose herein set forth.

[The object of this invention is to construct a fire grate in such a manner that a greater heat-radiating surface than usual will be exposed, and consequently a saving in fuel is effected.]

39,044.—Farm Gate.—W. C. Herider, Miami Town, Hamilton county, Ohio :

I claim the combination of the bars, B B′, one or more, and the adjusting chord-rods, D G, one or more, with the connecting rod, E, in the manner herein shown and described.

[This invention consists in a novel and improved manner of bracing the gate, whereby the same is rendered less liable to sag than usual, and in case it does sag is rendered capable of being restored or brought back to its original position.]

39,045.—Folding and ruling Paper.—J. P. Herron, Washington, D. C. :

I claim, first, The ruling and folding, Figs. 1 and 2, substantially as set forth.

Second, The rolling or packing, as described and shown in Fig. 5.

Third, The cutting of the paper into the form shown in Figs. 1 and 2, in combination with the ruling and folding shown in said Figs. 1 and 2, substantially as described.

39,046.—Shingle Machine.—Simeon Heywood, Claremont, N. H. :

I claim the combination of the beveled tilting bed, G′, shaft, l, and supporting bars, p, with the adjustable bars, H, reciprocating frame, D, levers, E F, dogs, G, and saw, C, in the manner and for the purpose herein shown and described.

39,047.—Steam Boiler.—Alonzo Hitchcock, New York City :

Securing the flues of steam boilers to heads which may be removed from the shell, substantially in the manner described and for the purpose set forth.

39,048.—Bog-cutting Machine.—Chester Hoisington, Seward, Ill. :

I claim the sled provided with the knife, A, and seat, F, as and for the purposes set forth.

Second, In combination with the sled I claim the adjustable scraper, B, constructed and operating as and for the purposes set forth.

Third, I claim the combination of the roller, C, provided with the box, E, with the sled and scraper, B, in the manner and for the purposes set forth.

39,049.—Thrasher.—J. P. Jager, Eureka, Wis. :

I claim the combination of the rocking beater frame with a fan and screen, substantially in the manner and for the purposes set forth.

39,050.—Churn Dasher.—Melvin Jincks, Steuben County, N. Y. :

I claim the arrangement of the arms, b, in the shaft, A, as and for the purpose herein described.

39,051.—Machine for hulling Barley, &c.—J. J. Johnston, Allegheny, Pa., and J. E. Weaver, Temperanceville, Pa. Ante-dated March 6, 1863 :

We claim the use of the wooden drum, h, with bevel or coniformed sides, in combination with the beveled or coniformed sides, d, of the case, and elevating bar, o, said drum and sides being coated with emery or its equivalent, as herein described and for the purpose set forth.

39,052.—Sash-fastener.—Morton Judd, New Britain, Conn. :

I claim, first, The lever, c, with the flange, 3, around the hub, 2, setting over the flange, b, on the plate, a, as specified.

Second, I claim the hollow hub, 2, and spring, 4, to retain the lever, c, in position, as specified.

39,053.—Envelope Machine.—J. M. D. Keating, New York City :

I claim, first, The adjustable bed in combination with the folding mechanism, substantially as described, whereby the machine can be readily adjusted to fold the envelope loose or tight and for varying thicknesses of paper, substantially as described and set forth.

Second, In combination with the folding mechanism, the plate, H, covering the aperture in the form, thereby preventing the blanks from catching or displacement as they are seized, and carried under the plunger, substantially as described and set forth.

Third, In combination with a movable form for carrying the blanks and a folding mechanism, substantially as described, the sleeve shaft, 4, to work the form, substantially as described.

39,054.—Holder of Tools for Grinding.—George Lissenden and John Lacy, Chicago, Ill. Ante-dated March 1, 1863 :

We claim, first, The movable bed pieces, C C, posts, D D, and guide, E, constructed, combined, arranged and operating substantially as set forth.

Second, The clamp, H, constructed substantially as described, turning on journals, 2 2, and suspended from the guide, E, by means of the pendent slides, F F, as and for the purpose set forth.

Third, The stone, A, frame, B, adjustable bed pieces, C, posts, D, with their adjusting screws, 5, the guide, E, clamp, H, and pendent slides, F, constructed, combined and arranged substantially as described.

39,055.—Churn.—J. A. Lloyd, St. Paul, Minn. :

I claim the wooden slat dashers, C C, in combination with the wire dashers, A A, lever bracket, gear and tub, all operating in the manner and for the purposes set forth.

39,056.—Lock.—S. N. Long, Chatham, Mass., and M. E. Hathaway, Wareham, Mass. Ante-dated June 9, 1863 :

We claim, first, The guard wheels, A, constructed with annular flanges, f, slotted at a, and serrated on their inner and outer surfaces, all as herein shown and described and for the purposes set forth.

Second, The described combination of the guard wheels, A, and index wheels, D, with clamp nuts, d, for connecting or disconnecting them, as explained.

Third, The combination of the bolt, B, latch, E, and cam, C, all constructed and arranged as herein shown and described, so that the bolt and latch may be operated either simultaneously or separately, as explained.

[The object of this invention is to obtain a lock which can be locked and unlocked only by the person having charge of the same or by information from that person, and which is also proof against destruction by the introduction of gunpowder or other explosives.]

39,057.—Furnace for burning Tar, Oil, &c., as Fuel.—J. C. Love, Pittsburgh, Pa. :

I claim the use and combination of a series of long shallow troughs or trays with a box or heater used for supplying tar or oil to said troughs, through a series of pipes leading to the troughs or trays aforesaid, and placing said box or heater in such close proximity to the furnace as that the tar or oil shall become heated so as to generate gas before passing into the troughs or trays, for the purposes herein shown and set forth.

I also claim constructing the grate-bars and trays so that they may be reversed, for the purposes herein shown and set forth.

39,058.—Drum.—J. Mason, Louisville, Ky. :

I claim the employment or use of the plates, D, provided each with two hooks, a a′, or pulleys, and attached to the body or cylinder of the drum, as described, in connection with the straining cords, E E′, hoops, B B′, and with or without the hooks, C, all arranged as and for the purpose set forth.

[This invention relates to an improvement in straining the heads of the drum, whereby the heads may not only be strained separately, but with equally as great facility as in the old mode of construction and without rendering the drum any more cumbersome.]

39,059.—Lubricating Axle Boxes.—C. Mezeix, New York City. Ante-dated Nov. 9, 1861 :

I claim the arrangement of the reciprocating piston, f, pump barrel, F, and ascension tube, g, in combination with the reservoir, A, surrounding the axle box, B, the whole being constructed and operating substantially in the manner and for the purpose shown and described.

[This invention consists in arranging in the interior of the reservoir which surrounds the axle box and which contains the oil or grease, a reciprocating piston operating in a suitable cylinder and operated by an eccentric or any other suitable means, in combination with a curved ascension tube or spout, in such a manner that, by the action of the piston, the grease is forced up and discharged through the spout on the journal, and that the surplus grease, which drips down from the journal, is sucked up by the pump and used over and over again, as long as the axle is in motion.]

39,060.—Running Gear of Locomotives.—Thos. H. Neal, Pittsburgh, Pa. :

First, I claim transmitting motion from the crank shafts to the wheels bearing on the rails, by means of the friction rollers operating in the manner, and by the means described and for the purpose set forth.

Second, I claim securing the bearings of the crank shafts in the same pedestals wherein the bearings of the axles rest, and so arranging the crank shafts with relation to the wheels bearing on the rails, as that said wheels and crank shafts shall take the entire weight of the locomotive, as herein described and for the purpose set forth.

39,061.—Brick Machine.—J. N. Newell, Des Moines, Iowa :

I claim, first, The rotating mold cylinder, I, provided with sliding plungers, f f, when used in connection with the traction wheels, L L, and fitted in a mounted frame, A, provided with a frame-elevating or adjusting mechanism, and all arranged in such a manner as to admit of the mold cylinder being rotated either by traction or any extraneous power, as herein set forth.

Second, The combination of the mold cylinder, I, hopper, F, provided with rotating rods, c, sand box, M, and scraper, S, all fitted or placed in a mounted frame, A, and arranged for joint operation, as and for the purpose specified.

Third, The rod, O, provided with the cam, Q, in combination with the fixed cam, R, and the adjustable plate, N, to which the axles, u u, of the wheels, B, are attached, all being arranged as shown to admit of the adjustment of the frame, A, as and for the purpose specified.

Fourth, The rotating oblique rods, c, when used in combination with a rotating mold cylinder, I, for the purpose set forth.

39,062.—Straw-cutter.—D. J. Owen, Springville, Pa. :

I claim connecting or attaching the tubular feed roller, M, with its shaft, L, by means of the coil springs, N N, and disks or heads, d′ d′, and arranged specifically as herein shown and described, in combination with the feed roller, E′, cam, J, pawl, F, and ratchet, d, all combined and arranged to operate conjointly as and for the purpose herein set forth.

[This invention relates to an improved feed mechanism of that class in which fluted pressure rollers are employed. The object of the invention is to obtain a means for rendering the upper adjustable feed roller more perfect in its operation than heretofore, so that it will conform better to the varying thickness of the layer of straw which passes underneath it and at the same time insure a regular or uniform feed of the straw to the cutters.]

39,063.—Grain Separator.—J. J. Palmer and A. Plamondon, Chicago, Ill. :

We claim the board, F, attached to the shoe or box, C, and arranged relatively with or applied to the hopper, G, so as to form a continuation of the inner side, b, thereof, to operate as and for the purpose herein specified.

[This invention consists in a novel and improved arrangement of a blast fan and blast spout, whereby the grain, before passing on the screens is subjected to a blast, and all light foreign substances are separated from it, so that the screens will be enabled to operate much more efficiently than hitherto in separating oats and heavy substances from the wheat. The invention also consists in the employment of a vibrating throat placed in the hopper but connected to the shoe and arranged in such a manner as to effectually prevent the hopper from becoming choked or clogged.]

39,064.—Slide Valve for Steam Engines.—William Porter, Mystic River, Conn. :

I claim, first, The arrangement of the surface, M, main slide faces, B B′ B″, cut-off slides, X X′, and ports, b b′, all substantially in the manner and for the purpose herein set forth.

Second, The construction and arrangement of the back plate, M, steam-chest, A, wedge faces, m m, and single set of adjusting means, M′, or their equivalents, substantially as and for the purpose herein set forth.

Third, The arrangement of the draining passages or pipes, N N′, relatively to the sliding adjustable back plate, M, and to the balance face, B″, of the main slide, substantially as and for the purpose herein set forth.

39,065.—Pump.—Washburn Race, Lockport, N. Y. :

I claim the combination of the grooved metallic, water-packing piston, B, and leather packing, a, or its equivalent, arranged in such a manner that the metallic portion slides easily in the cylinder and forms the guide, while the leather portion produces a more perfect packing without being subject to great wear, substantially as herein set forth.

I also claim the groove or enlargement, I, in the pump, with the contracted opening, m, above, by which means the water is prevented from overflowing and a greater pressure is produced in the spout, substantially as described.

39,066.—Watch.—J. A. J. Redier, Paris, France :

I claim, first, The combination of the shaft, T, pinion, P′, and wheels, H R, arranged and employed as described, to wind the watch.

Second, The combination with the above parts or their equivalents of the knob, M, lever, K L, and pinions, i n′, for setting the hands.

39,067.—Means for Speed in the Propulsion of Vessels.—J. F. Reigart, Washington, D. C. :

I claim a self-acting wave-propeiler and breaker revolving and operating in advance of the vessel for the purpose of accelerating its speed, by dividing the waves and opening a way to relieve the vessel from the resistance of the water.

39,068.—Power Windlass.—E. B. Requa, Jersey City, N. J. :

I claim, first, The combination of fixed and movable centers or center bearings, with a drum and the friction surfaces of fast and loose disks or their equivalent, substantially as described.

Second, The construction and use of the sleeve or cap as arranged on the shaft and intervened between the center-bearing and drum, for the purposes set forth.

Third, I also claim imparting the end thrust required to effect and maintain the contact of the friction or clutching surfaces, by means of a screw fixed in the lever or its equivalent, in combination with the sleeve or other competent device, arranged and used substantially in the manner and for the purposes specified.

39,069.—Hanging Venetian Blinds.—H. W. Safford, Philadelphia, Pa. :

I claim the combined arrangement described of the open pulleys, C C′ C″, with the suspending cords, D D′, and the single set of hoisting cords, E E′, the whole operating together substantially in the manner described and for the purposes specified, whether the said pulleys be attached directly to the window frame or to a separate supporting board attached thereto and forming part of the blind, as described.

39,070.—Composition for Casts, Fancy Articles, Toys, &c.—Michael Schall, New York City :

I claim the application of terra-alba for "rendering" stearine matter to produce casts of fancy articles, toys and confectioners' ornaments of every variety, substantially as herein described.

39,071.—Case or Box for holding Oil, &c.—Samuel Selden, Erie, Pa. :

I claim an oil package consisting of a box, A, made of four boards, a, rabbeted together and to heads, b, and of a casing, B, surrounding the box, A, in the manner and for the purpose substantially as shown and described.

[This invention consists in an oil package having two boxes, one fitting closely into the other, the inner box to be made of four sides rabbeted together and provided with heads, one at each end, which are rabbeted to the sides and the outer box consisting of four sides only, which are dovetailed or otherwise secured together and strengthened by transverse strips in such a manner that oil or other liquid, filled in the inner box, can be safely kept and forwarded to any distance without danger of leakage.]

39,072.—Spout for conveying Sap.—Moses Shelden and W. A. Chase, Calais, Vt. :

We claim the within-described spout as a new article of manufacture, the same being formed in lengths having an angular exterior, E F, and a corresponding interior, B C, at one end, and being rounded and chamfered substantially as represented by M M′, for the purpose herein set forth.

39,073.—Grain Separator.—Henry Siddall, San Francisco, Cal. :

I claim, first, The conveyer, C, when used as and for the purpose set forth.

Second, I claim the trough or gutter, D, or an equivalent thereto, for the purpose described.

Third, I claim the cut-off or dividing pieces, H and I, when made as described and used for the purpose set forth.

Fourth, I claim the pieces, N and O, in combination with pieces, M, for the purpose set forth.

Fifth, I claim the unperforated surfaces, L, and screens, K, in combination with screens, J, for the purpose set forth and described.

Sixth, I claim the return chambers, T, spouts, 3, conveyer, V, spout, 7, and elevator, A B, for the purpose of returning a part of the grain, as set forth and described.

Seventh, I claim the process of returning a part of the grain to pass through the screening apparatus again at the same time, and with the regular supply of grain, as herein set forth.

39,074.—Machine for cutting-out Bayonet Scabbards.—H. D. Smith, New York City. Ante-dated June 16, 1863 :

I claim, first, Having the inclined oblique knives of one cylinder arranged in reverse position to those of the opposite cylinder, so that each edge of each scabbard and blank will be cut with an inward bevel, substantially as herein shown and described.

Second, The combination with the knives, arranged as above described, of the feeding device, C, as herein shown and set forth.

39,075.—Cut-off Valve Gear, Robert Stewart, Elmira, N. Y. :

I claim, first, The cylinder, C, and piston, D, in combination with

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the vertical platform and braces, G, when constructed and operating substantially as described and for the purposes set forth.

Second, The combination of a cross-head, H, and connecting rods I, with a cut-off valve, substantially as and for the purpose described.

39,076.—Combined Collar and Hames for Horses.—S. B. Stewart, Center Township, Pa.:

I claim, first, The combination of the collar, A, and hames, B, substantially as described, so that they shall form but one piece, as set forth.

Second, The combination of the tenon, C, ferrule, D, strap, d, staple, c, and hooks, c', as described, for the purpose of uniting the two sides of the collar, as set forth.

39,077.—Boiler for Culinary Purposes.—P. L. Suine, of Shirleysburgh, Pa.:

I claim a boiler for culinary purposes constructed with an internal tube or pipe communicating at its upper end with the interior of the boiler and provided at its lower end with a hole or opening, so that said tube or pipe, when the boiler is fitted in a hole in the top plate of the stove, will be below the stove plate, and form a communication between the tube or pipe and the flue of the stove, substantially as and for the purpose herein set forth.

[This invention relates to a new and improved boiler for cooking and consists in having a tube or steam pipe secured within the boiler the upper end of the former being about on a level with the top of the latter, and the lower end extending to the bottom of the boiler and communicating with the external air. By this arrangement the steam from the boiler, instead of escaping into the apartment as hitherto, is made, when the boiler is fitted on the stove and the cooking process going on, to escape down the steam pipe into the flue of the stove.]

39,078.—Purifying Iron and Steel by means of Blasts of Air.—G. W. Swett, Troy, N. Y.:

I claim the use of the apparatus above described, in the manner and for the purpose above specified.

39,079.—Water Elevator.—D. E. Teale, Norwich, N. Y.:

I claim, first, the catch or click, k, placed upon the pawl, F, and operated by the hook, e, and by the projection, p, placed upon the outer edge of the rim, G, as set forth.

Second, In combination with the cylinder, B, and cord or its equivalent, I claim the stops, s s, moving in the slots, r r, of the arms, A A, as and for the purposes set forth.

39,080.—Putting up Caustic Alkalies.—E. A. Thomas, Philadelphia, Pa.:

I claim a package of caustic alkali inclosed in a glass, stone or earthenware jar, sealed with a non-corrosive cement, as and for the purpose specified.

[The object of this invention is to enable the manufacturer of caustic alkalies to put them up in original packages of such convenient size that when a package is opened, the whole of it may be used at once in a family without loss.]

39,081.—Joint for Pipes.—H. E. Towle, New York City:

I claim the combination of the flexible flange or flanges with an internal sleeve, substantially in the manner described and for the purpose specified.

39,082.—Refrigerator for Soda-water and Sirups.—J. W. Tufts, of Medford, Mass.:

I claim the new or improved sirup refrigerator or cooler, consisting of the series of main sirup-holders or chambers, a, the series of auxiliary lateral chambers, c, and the ice chamber, b, the whole being arranged and so as to operate together substantially as explained.

And I also claim the arrangement of sirup and soda vessels or holders, a a and c c, and the ice or refrigerating vessels or chambers, b, the whole being substantially as specified.

39,083.—Submerged Propeller.—Robert Vaile, Cromwell Terrace, Westbourne Green, London, England. Patented in England, April 28, 1862:

I claim driving endless-chain propellers by means of drums with a collar or collars on shafts and chains to which floats are attached, the collars and chains being constructed and the attachment effected in the manner hereinbefore described.

Also connecting the floats to the endless chains by means of spindles working in lines formed in a piece with links in the endless chains, as hereinbefore described.

Also, the means of causing the floats to assume and retain their respective positions for entering the water, for producing their greatest propelling effect in the water, for feathering on leaving the water and for returning to again enter the water, consisting of guides and grooves, and of appliances on the floats, all acting substantially in the manner hereinbefore described.

39,084.—Pen.—A. F. Warren, Brooklyn, N. Y.:

I claim the flexible and elastic band or clasp, B, applied to a pen, substantially as and for the purpose herein specified.

[The object of this invention is to convert an ordinary gold or other pen into a fountain pen, and to this end it consists in the application to and around the nibs of such pen of a band or clasp of vulcanized india-rubber or other flexible and elastic substance, such band or clasp retaining above it in the pen a considerable quantity of ink, and so forming a fountain but not interfering with the elasticity of the pen or with the flow of ink down the slip of the point thereof.]

39,085.—Watch.—Alexander Watkins, London, England:

I claim having the axis of the escapement lever placed equi-distant between the pallet faces and the notch of the fork, w, in combination with the arrangement of the three axes, h' i' k', on the same plane, as and for the purpose herein shown and described.

[This invention consists in so arranging the escapement wheel with its axis in the same plane with the staff of the balance and pivot of the escapement lever that the leverage exerted by the escapement wheel on the two pallets is equal and the distance from the pivot of the escapement lever to the notch of the fork is equal or nearly so to the distance from the faces of the pallets.]

39,086.—Soda-water Fountain.—D. & T. Williams, San Jose, Cal.:

We claim as an improved article of manufacture a soda-water fountain constructed of sheet-metal with its heads, B B, fitted and secured in it substantially as shown and provided with a tube, C, eduction pipe, D, and discharge pipe, H, the eduction pipe, D, having two passages, d d, within it, and provided with a valve, f, fitted in a chamber, e, as herein described.

[This invention relates to a new and improved portable soda-water fountain designed to be placed on counters, the soda-water being drawn directly from the fountain. The invention consists in constructing the fountain in a novel way and providing it with an eduction pipe and cock, all arranged in such a manner as to form an improved article of manufacture for the purpose specified.]

39,087.—Car Coupling.—C. C. Wilson, Kewannee, Ill.:

I claim the plate, C, of circular or approximate form and provided with a shoulder, e, in combination with the stop or bar, F, and loop, H, or its equivalent, all arranged relatively with each other and in connection with the draw-head, A, to operate as and for the purpose specified.

I further claim the jog, d, in the back part of the recess, a, for the purpose of holding the link in a horizontal position as specified.

[This invention consists in the employment or use of a circular hook-plate placed eccentrically on a shaft in the draw-head and arranged with a stop in such a manner that the hook will serve as a fastening for the links, so that the latter wherein thus fitted in two adjoining draw-heads will form a connection between the cars thereof. The hook-plate is so arranged that it will, when not in use, remain in a position to admit of the link when it enters the draw-head to connect itself and the hook-plate is so formed that it will hold or retain the link in a horizontal position when fitted in one draw-head only so that the outer or disengaged end of the link may enter the draw-head of an adjoining car.]

39,088.—Stove.—Franklin Woods, Chicago, Ill.:

I claim the pipes and flues, B B' G G' F F', and E E', and openings, a a', in combination with the fire-chamber, A, the several parts being arranged and operating as and for the purpose specified.

39,089.—Method of operating Cut-off Valves of Steam Engines.—William Wright, Hartford, Conn.:

I claim the combination of the pin, e, held in its relation to the face of the cam by the collar, d, and the slotted plate, b, with the toe of the lift-rod, in the manner and for the purpose substantially as set forth.

39,090.—Grain Separator.—Elijah Young, Tuscarora, N. Y.:

I claim, first, A sieve constructed partly of wire gauze and partly of a perforated plate, substantially as described.

Second, A sieve constructed as above described, in combination with a separator, F, attached to the under side of the rear end of the sieve, said plate, F, to be either plain or perforated, fixed or adjustable.

Third, The adjustable strips, H, or their equivalents for the purpose set forth and substantially as described.

Fourth, The combination of the sieve, E, and the adjustable discharging screen, K, for the purpose set forth, when constructed and arranged substantially as described.

39,091.—Mode of stopping and starting Cars.—Thomas S. Bigelow (assignor to himself, Luther E. Porter & Samuel M. Rowe), Lake Mills, Wis.:

I claim, first, The combination of the clutches, d d', the miter wheels, F F' and E, the revolving shaft, A, and the spring, S, constructed, arranged and operating substantially as and for the purpose herein delineated and set forth.

Second, I claim the combination and arrangement of the miter wheels, M I, the drums, N P, chains, p p', and ratchet wheel, R, constructed and operating as and for the purpose specified and shown.

Third, I claim the arrangement of the miter wheel, E, with the adjustable sleeve, b, and the spring, S, for the purpose herein specified.

Fourth, I claim the arrangement of the lever, L, and the rods, i l k and h, with the levers, m n, substantially as shown for the purpose of operating the clutches, d d', as specified and described.

Fifth, I claim the combination of the lever, D, the revolving rod, C, and the movable support, a, for the purposes herein specified and shown.

39,092.—Sewing Machine.—Reuben W. Drew, Abington, Mass., assignor to Alfred B. Ely, Newton, Mass.:

I claim the application of heat by or through the flame of a lamp, gas burner, or their equivalents to waxed thread sewing machines in the manner substantially as described for the purpose of warming the thread, and rendering it pliable.

39,093.—Grain Separator.—James Fargusson, Dubuque, Iowa, and Charles S. Burt, Dunleith, Ill., assignors to the said James Fargusson:

We claim, first, The application of a rigid or flexible support, b2, to grain riddles so that a connecting rod, J, and an eccentric, G, within a closely fitting strap, f, may be arranged and employed for operating the riddles, substantially as and for the purpose described.

Second, The arrangement of the spring screw rods, a' a', made adjustable, in combination with a rigid or flexible support, b2, an eccentric, G, and a connecting rod, J, all in the manner substantially as described, and so that the riddles may be adjusted without affecting the eccentric as set forth.

Third, The arrangement of the hinged devices, F F, in combination with a riddle which parts the grain at the center and with a bottomless hopper placed over the ridge of the riddle; all in the manner substantially as described.

Fourth, The combination of the many-armed bracket, L, and a fan box made with a horizontal joint and adapted to form a vertical junction with the blast spout, C, substantially as described.

39,094.—Crank-wrist.—C. B. Garlinghouse (assignor to himself, George B. Garlinghouse & J. Dickason), Allensville, Ind.:

I claim in the construction of crank-wrists the cones, b and c, adapted to the pitman, E, and arranged in reference thereto, substantially in the manner and for the purpose herein shown and described.

39,095.—Water-proof Varnish for Paper, Cloth, &c.—Jonathan H. Greene, Christiansburg, Iowa, assignor to James B. Hodgskin, New York City:

I claim the combination of linseed oil, india-rubber, and benzine, or some equivalent solvent, substantially as and for the purpose set forth.

39,096.—Binding Attachment for Reapers.—W. D. Harrah & H. P. Jones (assignors to themselves and Ira M. Gifford), Davenport, Iowa:

We claim, first, The two arms, C D, arranged and connected together as shown, in connection with the bars or gatherers, H H, for the purpose of gathering the grain in compact form for binding as herein set forth.

Second, The clamp, E, formed of the fixed bar, c, pivoted bar, d, and catch, G, in connection with the rotary twisting arm, R, and knife, O, as and for the purpose described.

Third, The combination of the gearing, Q K L M, cam, l, and lever, N, arranged as shown for rotating the twisting arm, R, and operating the knife, O, at one operation or manipulation as set forth.

Fourth, The pressure arm or lever, U, arranged as shown and in connection with the reel, S, to operate as and for the purpose herein set forth.

[The object of this invention is to obtain a grain-binding device which may be attached to a reaper and operated by an attendant with the greatest facility, so as to firmly bind the sheaves with wire. Each sheaf being bound at one operation or with a single manipulation.]

39,097.—Signal Bell and Brake Attachment for Railroad Cars.—Dennis Harrigan, Winchester, Mass., assignor to Alfred B. Ely, Newton, Mass.:

I claim in combination with the jointed arms, O P, placed on or under the roof of the car and working horizontally, the moveable bunter, T, and rigid bunter, Y, for the purpose of making a compensating attachment for a car, brake or bell rope, substantially as described.

39,098.—Apparatus for cooling Coffee.—Daniel G. Harrison & Jabez Reynolds (assignors to Harrison & Wilson), Cincinnati, Ohio:

We claim the rotating cylinder, A, with or without the internal spiral plates, h, in combination with the elevator, F, and chutes, I, one or more, all arranged for joint operation as and for the purpose herein set forth.

[This invention relates to an apparatus or device for cooling coffee after the same has been roasted by means of furnaces or the usual coffee-roasting devices. The invention consists in the employment of a horizontal or a slightly inclined rotating cylinder arranged in connection with an elevator and chutes described, whereby the desired end is attained.]

39,099.—Table for Reciprocating Saws.—C. C. Hinchman (assignor to himself, J. M. Hinchman & J. R. Hinchman), Clarksboro', N. J.:

I claim, first, The table composed of the top, A, and base, B, the former having segmental plates, D, adapted to rollers on the base, and the whole being arranged and operating, and being combined with a reciprocating saw substantially as specified.

Second, In combination with the top, A, of the table and its segmental plates, D, I claim the pinion, F, gearing in teeth formed on one of the said plates, the said pinion being operated by the gearing herein described or any equivalent to the same for the purpose specified.

Third, In combination with the adjustable top, A, of the table, I claim the graduated quadrant, M, for the purpose set forth.

39,100.—Arrangement of Valves for Steam Engines.—Green B. McDonald (assignor to himself and Dennis Long), Louisville, Ky.:

I claim the arrangement relatively to each other of the valve chamber, C, nozzle, E, valve seat, a, valve, D, and exhaust pipe, F, substantially as herein described with reference to Fig. 2.

[This invention relates to engines with horizontal cylinders and puppet valves. Its object is to reduce the dead space in the eduction valve chambers, and thereby reduce the waste of steam between the cylinder and the eduction valves; and it consists in a certain arrangement of the valve chambers, valves, nozzles and exhaust pipes for this purpose.]

39,101.—Lamp.—Jacob Miller (assignor to himself and Ernest Prussing), Chicago, Ill. Ante-dated Feb. 14, 1863:

I claim, first, In combination with a wick-tube of any suitable form, a conical deflector with straight sides, of equal vertical length converging at an angle of about forty-five degrees to the perpendicular and an aperture at top formed with sides parallel with the top of the wick-tube, all substantially as herein set forth.

Second, Supporting the said deflector adjustably upon the wick-tube by means of rods, j, projecting from a flanged and slotted tube, G, fitting upon the said wick-tube with a yielding pressure.

Third, The collar, I, jointed rod, J j, and clamp screws, j, employed in the manner described, to support a reflector, shade, or other article in any desired position.

39,102.—Lamp Burner.—William Painter, Fallston, Md., assignor to Charles Painter, Owing's Mills, Md.:

I claim, first, Having the side pieces, h h, and the ends, g g, constructed and arranged in reverse inclined positions, in the manner herein shown and described.

Second, The combination of the attachment above specified with the tubes, F A, the latter being screwed into the fountain or body, B, of the lamp, and enclosing the wick-adjusting wheels, b, as set forth.

[This invention relates to a new and improved lamp burner for burning coal oil, without the aid of the usual draught chimney. The invention consists in having the wick-tube of the burner fitted in a tube which is screwed into the fountain or body of the lamp, said tube having the wick-adjusting mechanism within it, and a tubular slide fitted upon and extending above it, said slide having its upper end of flaring form, perforated and provided with a flame spreader and regulator, all being constructed and arranged in such a manner as to cause a clear, white and persistent flame void of smoke or odor.]

39,103.—Ruffle.—Abby H. Price (assignor to the Magic Ruffle Company), New York City:

I claim the within-described corded ruffle as a new article of manufacture, the same being formed of a gathered strip, A, attached to a folded binding, B, or its equivalent by a single series of machine stitches, D, with a cord, C, enclosed substantially in the manner and for the purpose herein set forth.

39,104.—Boot and Shoe Last.—Benjamin L. White (assignor to himself and A. Nutting), Westford, Mass.:

I claim the employment of the india-rubber or elastic peg-strips, E, in combination with the inclined grooves, a', plates, D, formed as shown, and the last, A, all in the manner and for the purpose herein shown and described.

[This invention consists in having the body of the last constructed of wood and provided at its sides adjoining its bottom with metal plates, metal plates being also secured on the bottom of the last at the toe and heel, and strips of india-rubber or other suitable or similar material inserted in the bottom of the last.]

39,105.—Nail Plate-feeder.—John S. Fisk, Youngstown, Ohio:

I claim, first, Retracting the nail plate preparatory to turning the same, by means of one or more cams, o1 o4, and a lever, V, and afterward restoring it by means of a spring, p', all substantially as described.

Second, The combination of one or more cams, o2 o5, lever, S, and rod, R, for raising the plate substantially as described.

Third, The rocking box, R', employed in the described combination with the plate rod, P, and elevating rod, R.

Fourth, The combination of the lever, T, rack, u, and pinion, u', or their described equivalents, for inverting the plate.

Fifth, The binged nut, F, employed in the described combination with the endless screw, D, and carriage, C, to advance the latter and permit its retraction.

Sixth, The combination of the levers, H G', rod, J, spring catch, I, stationary cam, X, and spring, j, operating substantially as and for the purpose set forth.

39,106.—Riding Spurs.—A. H. Langholz, Chicago, Ill.:

I claim the curved plate, A, arranged with its spring, C, pin, D, and slot, E, in combination with the forked and notched ends of the stay, H, forming a movable spur.

RE-ISSUES.

1,504.—Apparatus for making Water Gas.—W. H. Gwynne, White Plains, N. Y. Patented March 11, 1862:

I claim the distributing box, B, with its circulating and heating passage, D, and its perforated cover or top, C, the whole operating substantially as herein described and shown for the purpose set forth.

1,505.—Process of making Water Gas.—W. H. Gwynne, White Plains, N. Y. Patented March 11, 1862:

I claim the within described mode of obtaining a more uniform mixture of gases eliminated from coal and water, or their equivalents, in separate retorts, by supplying the hydro-carbon gas retort with gases eliminated from vapor of water in a separate retort by passing steam super-heated to about the temperature of the incandescent decomposing material in a finely divided state through the mass of said decomposing material, substantially as and for the purposes set forth.

1,506.—Stove.—Joseph C. Henderson, Albany, N. Y. Patented May 29, 1860:

I claim, first, A reservoir or hopper constructed at its lower end to contain and supply fuel, in combination with a fire-pot, separate from said reservoir, and to which the coal is supplied at or near the center, so that the products of combustion pass away from the surface of the fire around the contracted base of the said hopper substantially as specified.

Second, I claim a chamber or horizontal flue around the base of the reservoir or hopper, supplying coal, and over the surface of the fire, to receive and detain the products of combustion in contact with the fire heat until perfectly consumed as set forth.

Third, I claim a contracted outlet or opening from the said chamber or horizontal flue, formed as aforesaid, to prevent a too rapid escape of the products of combustion as specified.

Fourth, I claim the surrounding case, b, in combination with the said hopper, fire-pot, and chamber above the fire, for receiving the products of combustion from the said chamber and radiating heat substantially as set forth.

Fifth, I claim in combination with a hopper over the fire, a circulating current of air surrounding such hopper to aid in cooling the fuel in said hopper substantially as specified.

Sixth, I claim the supply door, f, and register, i, in combination with the hopper, e, and draft space, g, as set forth.

Seventh, I claim a circulating current of air passing through the hollow lower end of the supply hopper and entering the combustion chamber over the fire for promoting combustion and keeping the hopper from injury by heat as set forth.

1,507.—Whip-socket.—William H. Lyman, Newark, N. J. Patented April 15, 1856:

I claim the application to a whip-socket, A, of an elastic disk, B, provided with a hole, a, substantially in the manner and for the purpose herein shown and described.

[This invention consists in the application to the upper part or mouth of a whip-socket, of a disk of india-rubber or other elastic flexible material, said disk being stretched across the mouth or opening of the whip-socket and provided with an opening smaller than the diameter of the whip-handle in such a manner that when said whip-handle is placed into the socket the opening in the elastic disk closes up firmly all round and prevents dirt, dust, or other foreign substances from entering into the whip-socket and soiling the handle]

1,508.—Construction of Wheeled Vehicles.—Oren E. Miles, Aurora, Ill. Patented Feb. 5, 1862:

I claim, first, In wheel vehicles the arrangement of the rotating arm, C, and the wheel, hub or center, B, the latter being fitted within the other and confined and released by the bolt, c, or its equivalent, substantially in the manner and for the purpose herein set forth.

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Second, I claim in wheel vehicles the arrangement of the bolster, A, truss rods, f, center frame or part, G, outer bearing frames, E, or its equivalent and a rotating arm, C, carrying a wheel rigidly connected, substantially as and for the purpose herein set forth.

Third, I claim in wheel vehicles having a rotating arm, C, rigidly connected with the wheel, B, the within described and represented arrangement of the springs, s and h, and guiding pin, i, relatively to the bolster, A, hole, j, and box, D, or their equivalents for the purpose set forth.

Fourth, I claim in wheel vehicles the within-described arrangement of the rotating arm, C, parts, k k, and trunnions, l l, relatively to the levers, r r, frame, m, and block, G, or their respective equivalents for the purpose above set forth.

DESIGNS.

1,792.—Plate of a Stove.—John D. Flansburgh (assignor to North, Chase & North), Philadelphia, Pa.

1,793, 1,794, 1,795.—Cook's Stove (3 cases.)—Garrettson Smith & Henry Brown (assignors to North, Chase & North), Philadelphia, Pa.

IMPORTANT TO INVENTORS

PATENTS FOR SEVENTEEN YEARS.

MESSRS. MUNN & CO., PROPRIETORS OF THE SCIENTIFIC AMERICAN, continue to solicit patents in the United States and all foreign countries, on the most reasonable terms. They also attend to various other departments of business pertaining to patents, such as Extensions, Appeals before the United States Court. Interferences, Opinions relative to Infringements, &c. The long experience Messrs. MUNN & Co. have had in preparing Specifications and Drawings, has rendered them perfectly conversant with the mode of doing business at the United States Patent Office, and with the greater part of the inventions which have been patented. Information concerning the patentability of inventions is freely given, without charge, on sending a model or drawing and description to this office.

THE EXAMINATION OF INVENTIONS.

Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and submit it to us, with a full description, for advice. The points of novelty are carefully examined, and a written reply, corresponding with the facts, is promptly sent free of charge. Address MUNN & CO., No. 37 Park Row, New York.

PRELIMINARY EXAMINATIONS AT THE PATENT OFFICE.

The service we render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there, but is an opinion based upon what knowledge we may acquire of a similar invention from the records in our Home Office. But for a fee of $5, accompanied with a model or drawing and description, we have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a patent, &c., made up and mailed to the inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through our Branch Office, corner of F and Seventh streets, Washington, by experienced and competent persons. Many thousands such examinations have been made through this office. Address MUNN & CO., No. 37 Park Row, New York.

HOW TO MAKE AN APPLICATION FOR A PATENT.

Every applicant for a patent must furnish a model of his invention if susceptible of one; or, if the invention is a chemical production, he must furnish samples of the ingredients of which his composition consists, for the Patent Office. These should be securely packed, the inventor's name marked on them and sent, with the Government fees, by express. The express charge should be pre-paid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by draft on New York, payable to the order of MUNN & CO. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but, if not convenient to do so, there is but little risk in sending bank-bills by mail, having the letter registered by the postmaster. Address MUNN & CO., No. 37 Park Row, New York.

The revised Patent Laws, enacted by Congress on the 2d of March, 1861, are now in full force, and prove to be of great benefit to all parties who are concerned in new inventions.

The duration of patents granted under the new act is prolonged to SEVENTEEN years, and the Government fee required on filing an application for a patent is *reduced* from **$30** down to **$15**. Other changes in the fees are also made as follows —

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Re-issue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing a Disclaimer	$10
On filing application for Design, three and a half years	$10
On filing application for Design, seven years	$15
On filing application for design, fourteen years	$30

The law abolishes discrimination in fees required of foreigners, excepting natives of such countries as discriminate against citizens of the United States—thus allowing Austrian, French, Belgian, English, Russian, Spanish and all other foreigners except the Canadians, to enjoy all the privileges of our patent system (but in cases o designs) on the above terms. Foreigners cannot secure their inventions by filing a caveat; to citizens only is this privilege accorded.

During the last seventeen years, the business of procuring Patents for new inventions in the United States and all foreign countries has been conducted Messrs. MUNN & CO., in connection with the publication of the SCIENTIFIC AMERICAN; and as an evidence of the confidence reposed in our Agency by the inventors throughout the country, we would state that we have acted as agents for at least TWENTY THOUSAND inventors! In fact, the publishers of this paper have become identified with the whole brotherhood of inventors and patentees at home and abroad. Thousands of inventors for whom we have taken out patents have addressed to us most flattering testimonials for the services we have rendered them, and the wealth which has inured to the inventors whose patents were secured through this office, and afterward illustrated in the SCIENTIFIC AMERICAN, would amount to many millions of dollars! We would state that we never had a more efficient corps of Draughtsmen and Specification Writers than are employed at present in our extensive offices, and we are prepared to attend to patent business of all kinds in the quickest time and on the most liberal terms.

REJECTED APPLICATIONS.

We are prepared to undertake the investigation and prosecution of rejected cases on reasonable terms. The close proximity of our Washington Agency to the Patent Office affords us rare opportunities for the examination and comparison of references, models, drawings, documents, &c. Our success in the prosecution of rejected cases has been very great. The principal portion of our charge is generally left dependent upon the final result.

All persons having rejected cases which they desire to have prosecuted are invited to correspond with us on the subject, giving a brief story of the case, inclosing the official letters, &c.

CAVEATS.

Persons desiring to file a caveat can have the papers prepared in the shortest time by sending a sketch and description of the invention The Government fee for a caveat, under the new law, is $10. A pamphlet of advice regarding applications for patents and caveats, printed in English and German, is furnished gratis on application by mail. Address MUNN & CO., No. 37 Park Row, New York.

FOREIGN PATENTS.

We are very extensively engaged in the preparation and securing of patents in the various European countries. For the transaction of this business we have offices at Nos. 66 Chancery lane, London; 29 Boulevard St. Martin, Paris; and 26 Rue des Eperonniers, Brussels. We think we can safely say that THREE-FOURTHS of all the European Patents secured to American citizens are procured through the Scientific American Patent Agency, No. 37 Park Row, New York

Inventors will do well to bear in mind that the English law does not limit the issue of patents to inventors. Any one can take out a patent there.

Circulars of information concerning the proper course to be pursued in obtaining patents in foreign countries through our Agency, the requirements of different Government Patent Offices, &c., may be had gratis upon application at our principal office, No. 37 Park Row, New York, or any of our branch offices.

ASSIGNMENTS OF PATENTS.

Assignments of patents, and agreements between patentees and manufacturers are carefully prepared and placed on the records at the Patent Office. Address MUNN & CO., at the Scientific American Patent Agency, No. 37 Park Row New York.

It would require many columns to detail all the ways in inventors or patentees may be served at our offices. We cordially invite all who have anything to do with Patent property or inventions to call at our extensive offices, No. 37 Park Row, New York, where any questions regarding the rights of patentees will be cheerfully answered.

Communications and remittances by mail, and models by express (prepaid), should be addressed to MUNN & CO., No. 37 Park Row, New York.

TO OUR READERS.

RECEIPTS.—When money is paid at the office for subscriptions, a receipt for it will always be given; but when subscribers remit their money by mail, they may consider the arrival of the first paper a *bona fide* acknowledgment of our reception of their funds.

PATENT CLAIMS.—Persons desiring the claim of any invention which has been patented within thirty years, can obtain a copy by addressing a note to this office, stating the name of the patentee and date of patent, when known and inclosing $1 as fee for copying. We can also furnish a sketch of any patented machine issued since 1853, to accompany the claim, on receipt of $2. Address MUNN & CO., Patent Solicitors, No. 37 Park Row, New York

Models are required to accompany applications for Patents under the new law, the same as formerly, except on design patents when two good drawings are all that is required to accompany the petition, specification and oath, except the Government fee.

INVARIABLE RULE.—It is an established rule of this office to stop sending the paper when the time for which it was pre-paid has expired.

NEW PAMPHLETS IN GERMAN.—We have just issued a revised edition of our pamphlet of *Instructions to Inventors*, containing a digest of the fees required under the new Patent Law, &c., printed in the German language, which persons can have gratis upon application at this office. Address MUNN & CO., No. 37 Park-row, New York.

Binding the "Scientific American."

It is important that all works of reference should be well bound. The SCIENTIFIC AMERICAN being the only publication in the country which records the doings of the United States Patent Office, it is preserved by a large class of its patrons, lawyers and others, for reference. Some complaints have been made that our past mode of binding in cloth is not serviceable, and a wish has been expressed that we would adopt the style of binding used on the old series, *i. e.*, heavy board sides covered with marble paper, and morocco backs and corners.

Believing that the latter style of binding will better please a large portion of our readers, we commenced on the expiration of Volume VII. to bind the sheets sent to us for the purpose in heavy board sides, covered with marble paper and leather backs and corners.

The price of binding in the above style is 75 cents. We shall be unable hereafter to furnish covers to the trade, but will be happy to receive orders for binding at the publication office, 37 Park Row, New York.

Back Numbers and Volumes of the Scientific American.

VOLUMES I., II., III., IV., V., VII. AND VIII. (NEW SERIES) complete (bound) may be had at this office and from periodical dealers. Price, bound, $2 25 per volume, by mail, $3—which include postage. Every mechanic, inventor or artizan in the United States should have a complete set of this publication for reference. Subscribers should not fail to preserve their numbers for binding. VOL. VI. is out of print and cannot be supplied.

Notes and Queries

L. H. H., of Vt.—It is quite a common thing to make ice artificially, and several machines have been constructed to manufacture it upon a large scale. You will find one designed for this purpose illustrated on page 72, Vol. V. (new series) of the SCIENTIFIC AMERICAN, and another on page 256 of the same volume.

D. D. G., of Wis.—Zachariah Baker, of Erie, Ill., obtained a patent on Oct. 14, 1862, for the use of oats and barley with salt in a bath combined with smart weed, oxalic acid, kino, catechu, red sanders, &c., for tanning leather. We have never seen any leather that was made by this process and cannot, therefore, pass an opinion upon its merits.

A. P., of N. Y.—Alfred Smee is chemist to the Bank of England and resides in London. Electro-plating batteries are manufactured by Chester Brothers, Center street, in this city. You can find all the information required about electro-gilding in Smee's electro-metallurgy, except that which is derived by actual observation in witnessing the processes.

W. H. W., of N. Y.—The price for binding two volumes in one of the SCIENTIFIC AMERICAN is one dollar and twenty-five cents.

N. M., of Ind.—"Brewster's Optics" is the best scientific publication on the science. There is a very useful work on the "Uses and Abuses of Spectacles," published by Philips, Sampson & Co., of Boston. There is also a very valuable treatise on the same subject, containing instructions respecting the use of lenses, by Alfred Smee, M. D., of London.

A. S. C., of Pa.—Aquariums of every size, from 1 foot to 6 feet in length, are made here. The bottom of yours should be made of plank, coated with pitch or a varnish of sealing-wax dissolved in alcohol at the seams. It should contain several species of water plants. Change the water frequently and you may occasionally feed the fish with minced worms and water-flies.

S. B. W., of Ohio.—You will find the mode of constructing cone pulleys illustrated and described on page 38, Vol. I. (new series) of the SCIENTIFIC AMERICAN.

Money Received

At the Scientific American Office, on account of Patent Office business, from Wednesday, July 1, to Wednesday, July 8, 1863:—

J. B., of N. J., $20; A. H. C., of Wis., $20; G. R. B., of R. I., $20, W. W., of N. H., $20; O. N., of N. Y., $20; J. J. M., of Conn., $45; B. C. N., of Ill., $10; T. R., of N. Y., $20; H. M., of N. Y., $47; N. H. and H. A. K., of Ohio, $15; C. W., of Mass., $25; C. G. M., of Vt., $25; C. T. B., of Cal., $21; J. S. C., of Kansas, $20; H. C., of Cal., $24; W. P. H., of Conn., $280; L. C. W., of N. Y., $10; J. M. M., of Mass., $25; L. and G., of Pa., $20; W. H. B., of Cal., $20; K. and S., of N. Y., $25; G. T., of N. Y., $25; R. K., of Mass., $50; H. H. E., of Conn., $20; J. C., of Mass., $20; J. C., of Va., $25; Z. G. G., of N. Y., $45; L. N. L., of Mass., $40; R. G., of Conn., $45; R. B. M., of Ohio, $20; A. S., of N. Y., $16; W. McC., of N. J., $16; J. S. R., of Conn., $10; C. H. R., of Maine, $25; J. E. Van S., of Ky., $30; P. M., of Ill., $20; L. W., of Iowa, $15; C. P. C., of Mass., $15; T. P. R., of Mass., $16; I. P. T., of N. Y., $325; M. A. W., of Cal., $31; H. W. C., of Vt., $12; R. W. and D. D., of N. Y., $25; E. and W., of Mass., $20; W. M. D., of N. Y., $20; H. W. M., of N. Y., $20; R. S., H., of Ill., $20; R. F. W., of N. Y., $16; D. M., of Ind., $20; E. D. M., of N. H., $20; J. C., of R. I., $15; J. C., of N. Y., $25; G. M., of Ill., $25; R. and R., of R. I., $25; N. J., of N. Y., $25; G. S. M., of Ill., $9; A. W., of N. Y., $25; B. F. H., of N. Y., $16; J. B. S., of Ill., $29; E. C. C. K., of Conn., $16; S. F., of N. Y., $25; E. A. S., of N. Y., $25.

Persons having remitted money to this office will please to examine the above list to see that their initials appear in it, and if they have not received an acknowledgment by mail, and their initials are not to be found in this list, they will please notify us immediately, and inform us the amount, and how it was sent, whether by mail or express.

Specifications and drawings and models belonging to parties with the following initials have been forwarded to the Patent Office from Wednesday, July 1, to Wednesday, July 8, 1863:—

R. K., of Mass.; G. T., of N. Y.; S. F., of N. Y.; J. B. S., of Ill.; C. H. R., of Maine; G. M., of Ill.; J. C., of N. Y.; C. W., of Mass.; R. W. & D. D., of N. Y.; A. V. R., of N. Y.; H. W. C., of Vt.; A. W., of N. Y.; C. G. M., of Vt.; N. J., of N. Y.; F. W. M., of Ky. R. B. R., of N. Y.; E. A. S., of N. Y.; K. & S., of N. Y.; L. & G., of Pa.; J. M. M., of Mass.; H. C., of Cal.; R. R., of R. I.; M. & M., of Cal.; H. M., of N. Y.

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A VALUABLE WORK FOR INVENTORS, PATENTEES AND MANUFACTURERS.

The publishers of the SCIENTIFIC AMERICAN have just prepared, with much care, a pamphlet of information about Patents and the Patent Laws, which ought to be in the hands of every inventor and patentee, and also of manufacturers who use patented inventions. The character of this useful work will be better understood after reading the following synopsis of its contents:—

The complete Patent Law Amendment Act of 1861—Practical Instructions to Inventors, how to obtain Letters Patent, also about Models—Designs—Caveats—Trade-marks—Assignments—Revenue Tax—Extensions—Interferences—Infringements—Appeals—Re-issues—Defective Patents—Validity of Patents—Abandonment of Invention—Best Mode of Introducing them—Importance of the Specification—Who are entitled to Patents—What will prevent the Granting of a Patent—Patents in Canada and European Patents—Schedule of Patent Fees; also a variety of miscellaneous items on patent law questions.

It has been the design of the publishers to not only furnish, in convenient form for preservation, a synopsis of the PATENT LAW and PRACTICE, but also to answer a great variety of questions which have been put to them from time to time during their practice of upwards of *seventeen years*, which replies are not accessible in any other form. The publishers will promptly forward the pamphlet by mail, on receipt of six cents in postage stamps.

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WAR DEPARTMENT.

PROVOST MARSHAL GENERAL'S OFFICE,
WASHINGTON, June 30, 1863

I. Section 13 of the act, approved March 3, 1863, "for enrolling and calling out the national forces and for other purposes," is as follows:—

"SECTION 13. *And be it further enacted*, That any person drafted and notified to appear as aforesaid, may, on or before the day fixed for his appearance, furnish an acceptible substitute to take his place in the draft; or he may pay to such person as the Secretary of War may authorize to receive it, such sum, not exceeding three hundred dollars, as the Secretary may determine, for the procuration of such substitute, which sum shall be fixed at a uniform rate by a General Order made at the time of ordering a draft for any State or Territory; and thereupon such person so furnishing the substitute or paying the money shall be discharged from further liability under that draft. And any person failing to report after due service of notice as herein prescribed, without furnishing a substitute or paying the required sum therefor, shall be deemed a deserter and shall be arrested by the Provost Marshal and sent to the nearest military post for trial by Court-martial, unless, upon proper showing that he is not liable to do military duty, the Board of Enrolment shall relieve him from the draft."

It is hereby announced that the amount to be paid, in accordance with the foregoing section of the Enrolment act, by any person who may be drafted, in order to secure exemption from service, has been fixed by the Secretary of War at *three hundred dollars*.

II. The *Commissioner of Internal Revenue* in each Congressional District has been authorized by the Secretary of War and directed by the Secretary of the Treasury, to receive from drafted persons, who desire to pay it for the purpose of exemption, the money above specified. On receipt of this sum the Collector of Internal Revenue shall give the drafted person paying it *duplicate receipts*. One copy of these receipts shall be delivered to the Board of Enrolment on or before the day the drafted person is required to report for duty; and when so delivered to the Board the drafted person shall be furnished by the Board with a certificate of exemption (form 31, Regulations of Provost Marshal General's Bureau), stating that the person is discharged from further liability under that draft, by reason of having paid the sum of three hundred dollars.

III. The Provost Marshal shall make out, within the first Monday of every week, an abstract of persons to whom exemption from military service shall have been granted by the Board during the week previous. (Form 41.) All receipts or certificates of deposit delivered to the Board by persons claiming exemption on account of having paid the required sum of money, shall accompany the abstract.

JAMES B. FRY,
1 Provost Marshal General.

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FIBER-CLEANING MACHINE.—THIS VALUABLE machine, the invention of Eduardo J. y Patrullo, and illustrated on page 368, last volume, SCIENTIFIC AMERICAN, is now on exhibition where the public are invited to examine it, at the establishment of TODD & RAFFERTY, No. 13 Dey street, New York. 2 13

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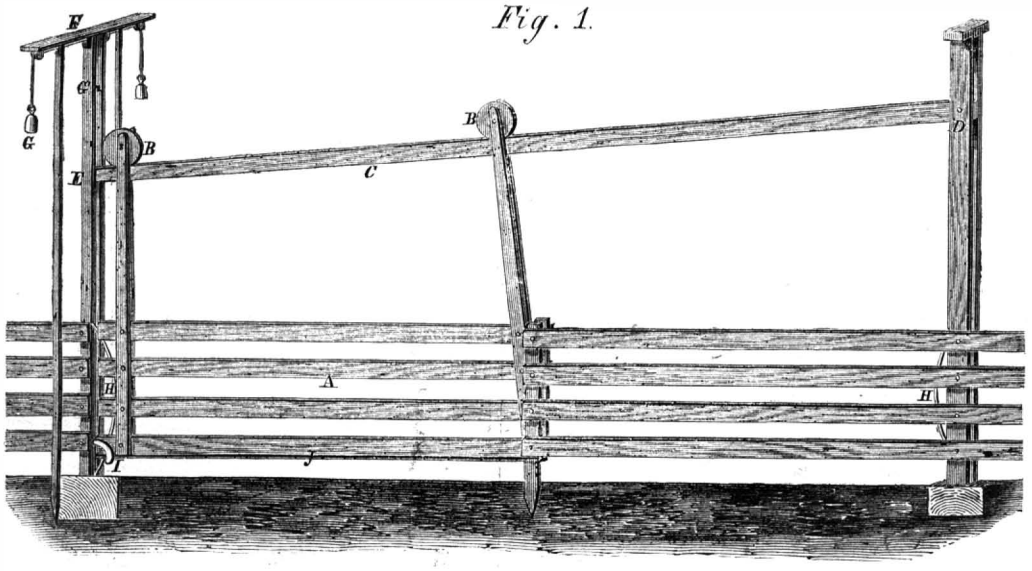
Patent Self-acting Gate.

It happens not unfrequently that farmers or others find themselves suddenly opposed in their progress over their premises by a heavy wooden gate, to open which they must get out of their vehicles before they can go further. This is not easily accomplished sometimes, as in the case of a restive horse ; or when a young gentleman finds himself so completely engaged in conversation with his "cousin," that to descend and do so unromantic a thing as to open a gate would entirely destroy the thread of his discourse. To avoid this and similar inconveniences, the self-acting gate herewith illustrated, has been invented, and we can certify that it is a very convenient arrangement, and will we think be generally appreciated by the public. Fig. 1, is an elevation of the gate, A ; this is suspended on rollers, B, which run upon the upper rail, C. This rail is jointed at D, and moves freely at the further extremity between the uprights, E. These upright timbers have a plank, F, common to both, crossing their tops, on the underside of which the cords, G, running in rollers, are carried, and connected with the loose end of the rail. There are also two uprights under each end of the cross timber which brace the main uprights that can be used for a hitching post. The cords have weights depending from them which balance the rail, C, and there are also two shoulders, G', in Fig. 2, on which the free end of the rail rests when the gate is opened or closed. The springs, H, mitigate the shock of the gate when it closes, and the guide, I, is provided to insure the proper position of the gate at all times, and prevent it from being blown open by the wind. The lower side of the bottom rail is faced with a board, J, three inches wide, so that the gate will work freely between the posts when running back and forth. It will be seen that when the cords are pulled, the free end of the rail, C, will rise through the uprights and carry with it the gate ; the latter will then be upon a plane inclining from the upright E to D, and will run down the same past the fence, and leave the passage clear. The reverse of this operation is performed when the gate is to be closed ; the rail is lowered from the shoulder on which it rests by the opposite cord, and the gate then descends by its gravity and completely stops the way. Fig. 3 shows the way in which the shoulder that the rail rests upon when the gate is open, is made, and Fig. 4, shows the manner in which the rail latches on the shoulder of the front post, and also on the pin, thereby gaining the full strength of all the parts. All the parts are easily operated by a child twelve years old, and the perishable materials, such as the cords (or chains when required), are sheltered from the weather and will last a long time. The cost of such a gate is, we are assured, not above that of an ordinary one, and the advantages it presents over those not so constructed, it will be apparent to every one, make it actually cheaper than a cumbersome, slamming affair, that takes two men and a boy to swing on its hinges. This gate is the invention of James M. Pierce, of Mokena, Ill., and was patented through the Scientific American Patent Agency on April 28, 1863 ; further information can be had by addressing him at that place.

Fig. 1.



PIERCE'S PATENT AUTOMATIC GATE.

Fig. 2.

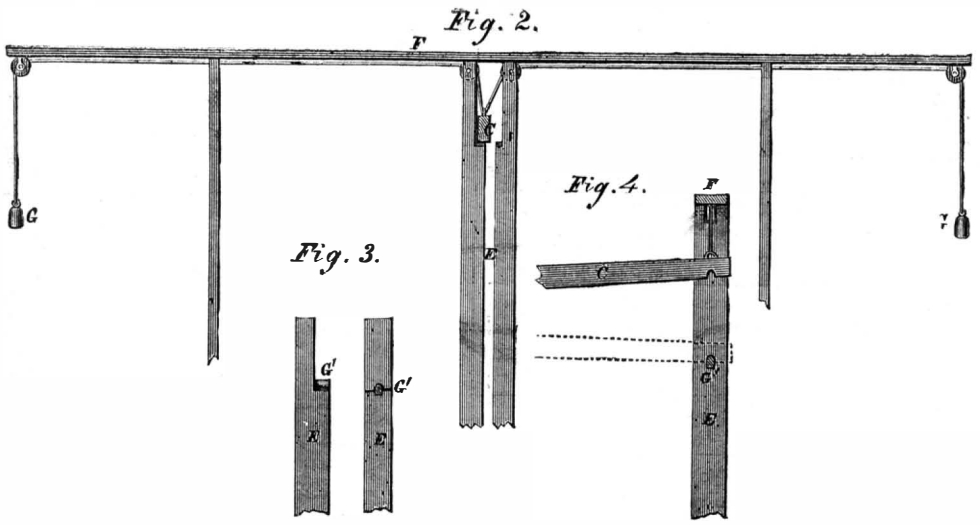


Fig. 3.

Fig. 4.

RED LEAD FOR PROTECTING IRON.

At a recent meeting of the Society of Arts, London, the question of preserving iron from rusting formed a subject of conversation, and important remarks were made by members, who stated that galvanized iron wire for telegraphs was not affected with rust in passing through rural districts, but the coating of zinc on the iron afforded no protection to wires in cities. The acid gas generated by the combustion of fuel attacked the gas and decomposed it. A new substitute for covering telegraphic wire was desirable.

With respect to paints for coating iron, such as the plates of iron vessels, machinery, &c., Mr. John Braithwaite stated that pure red lead was the best. His experience dated as far back as 1806, with the use of red lead, and for fifty years he had used it with success. White lead was more injurious than beneficial as a paint for iron. In the month of April last he inspected a well, 200 feet deep, a short distance out of London, where he had put up an engine forty-five years ago; the long iron rods which had been placed in it had been painted with red lead, and the metal had remained unchanged in all that period. The same preservative effects of red lead paint on iron he had witnessed upon other iron-work which had been many years in use.

THE pay of the engineers on the blockade-runners is said to be $1,500 per month. It is not stated whether the sum is paid in gold or Confederate money —if in the latter, their services are cheap enough!

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